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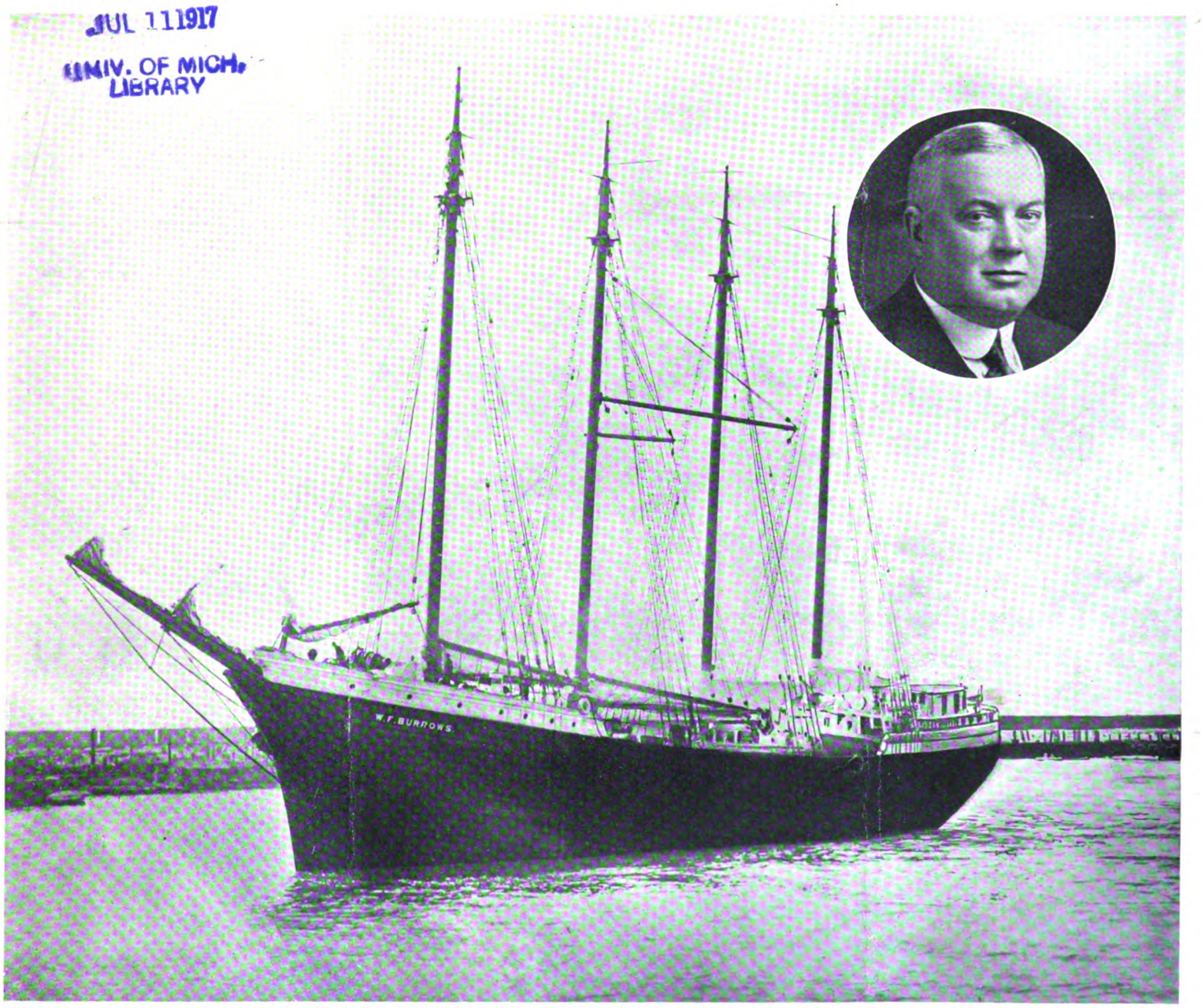
MOTORSHIP

(Trade Mark Registered U. S. Patent Office.)

In the Interests of Commercial Motor Vessels

Vol. 2 JULY, 1917 No. 7

SEATTLE NEW YORK



MOTOR SCHOONER "W. F. BURROWS," RECENTLY COMPLETED FOR LIBBY, McNEILL & LIBBY

Above: W. F. Burrows, President of Libby Company, for Whom the Vessel Was Named.

Published on the Twenty-fifth of the Month

MOTORSHIP

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Vol. 2 SEATTLE, U. S. A., JULY, 1917. No. 7.

Government Standard Ship Contracts to Date

IN the June issue of Motorship, we were able to present to our readers an authoritative and complete list of contracts let by the government up until the time of going to press. For this issue, also, we have received from the government a similar list, giving the names of the companies to whom contracts have been let to date, the general form of these contracts and specifications, and delivery terms. We are printing a complete list of contracts up until June 28:

Merrill Stevens Company, Jacksonville, Fla., twelve wooden and four steel cargo ships complete. Deliveries: Steel, one in twelve months and one each succeeding month; wood, one in nine months and one each succeeding month.

Los Angeles Shipbuilding & Dry Dock Company, Long Beach, Cal., eight steel ships complete. Deliveries in pairs May, June, October and November, 1918.

G. M. Standifer Construction Corporation, Portland, Ore., ten wooden steamers complete. Deliveries in pairs eight, nine, ten, eleven and twelve months.

Peninsula Shipbuilding Company, Portland, Ore., four wooden steamers complete. Deliveries February, March, April and May, 1918.

Sloan Shipyards Corporation, Seattle, sixteen wooden steamers complete. Deliveries: Two January, two February, four March, two April, two May, two June, two July, 1918.

Grays Harbor Motorship Corporation, Aberdeen, Wash., four wooden hulls only. Deliveries: One January, one February, one March, one April, 1918.

Coast Shipbuilding Company, Portland, Ore., four wooden hulls. Deliveries: One January, one March, one May, one July, 1918.

Edward F. Terry and Henry L. Brittain, New York City, twenty composite steamers complete. Deliveries: One February, 1918; remainder in ten months thereafter.

Skinner & Eddy Corporation, Seattle, six steel steamships complete. Deliveries: Two within five months after date of arrival of keel plates, remaining four in pairs at intervals of approximately six months after completion of first two.

Sanderson & Porter, 52 William St., New York City. Works at Willapa Harbor, Wash. Ten wooden hulls; first hull to be delivered on April 1, 1918, and one hull to be completed every fifteen days thereafter, ending August 30, 1918.

The Maryland Shipbuilding Company, Lexington Bldg., Baltimore, Md. Works at Sollars Point, Md. Six wooden hulls first hull to be delivered April 30, 1918, one on last day of each succeeding month ending September 30, 1918.

Seattle Construction and Dry Dock Company, Seattle, Wash. Ten steel cargo-carrying steamers complete. Deliveries: First and second steamers to be delivered June, 1918; third in July, 1918; fourth and fifth in August, 1918; sixth in September, 1918; seventh and eighth in October, 1918; ninth in November, 1918; tenth in December, 1918.

The Foundation Company, Woolworth Bldg., New York City. Works at Newark, N. J. Ten wooden hulls. Deliveries: First on March 1, 1918; one every fifteen days thereafter, ending August 15, 1918.

Groton Iron Works, 50 Broad Street, New York City. Works at Noank, Conn. Twelve wooden hulls. Deliveries: First, five months after receipt of lumber for keels, one hull every two weeks thereafter, ending September 15, 1918.

Ship Construction and Trading Company, 50 Broadway, New York City. Works at Stonington, Conn. Two wooden hulls. Deliveries: First by February 12, 1918; second by March 12, 1918.

Moore and Scott Iron Works, San Francisco, Cal. Ten complete steel cargo steamers. Deliveries: Two by February, 1918; one in March; two in June; one in August; two in October; two in November.

Portland Ship Ceiling Company, 130 Commercial Street, Portland, Maine. Four wooden hulls. Deliveries: February 1, 1918, March 5, 1918, May 1, 1918, June 15, 1918, respectively.

Universal Shipbuilding Company, 25 Broad St., N. Y. City. Works: Houston Ship Canal, Harris County, Texas. Twelve wooden hulls, 1 and 2—seven months after completion of ways; 3 and 4, eight months after completion of ways; 5 and 6, nine months after completing of ways; 7 and 8, ten months after completion of ways; 9 and 10, eleven months after completion of ways; 11 and 12, twelve months after completion of ways.

McBride and Law, Beaumont, Texas, (after completion of ways). Four wooden hulls. Deliveries: March, April, May, June, 1918.

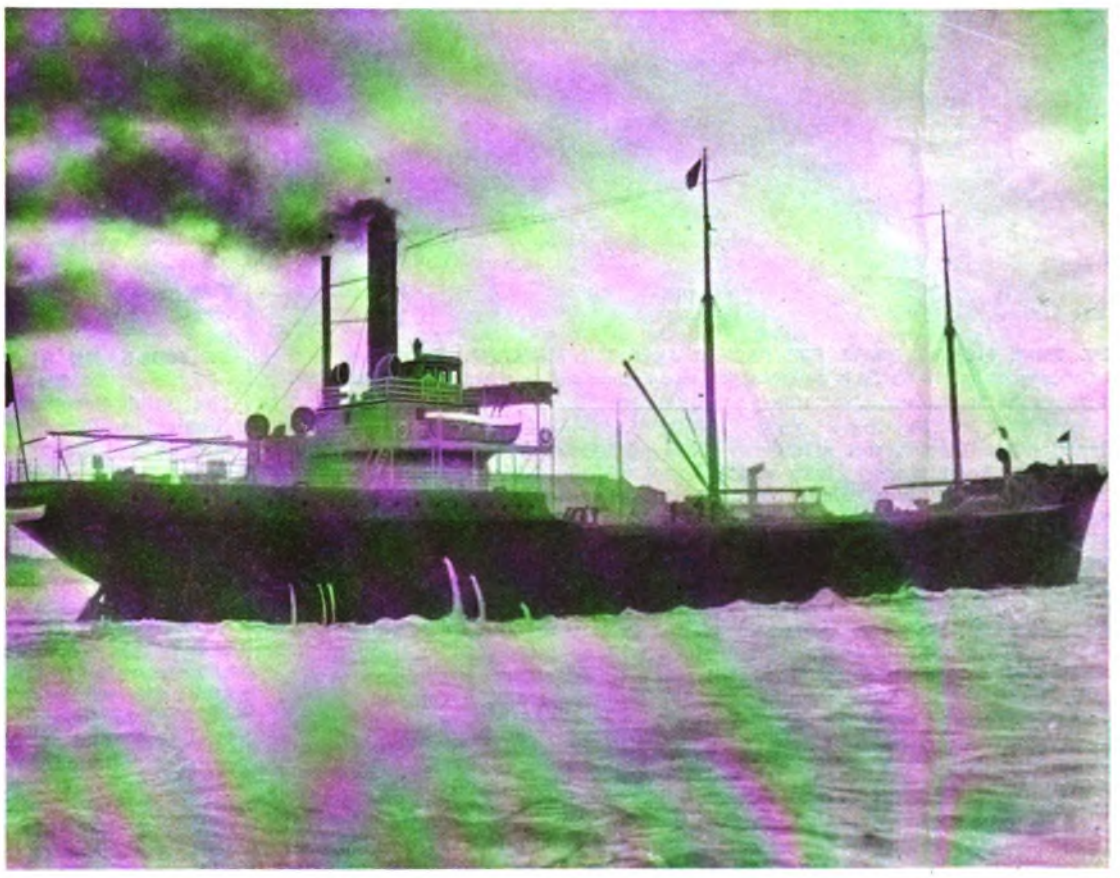
Newcomb Life Boat Company. Four complete wooden steamers. Deliveries: One January 15, 1918; one every sixty days thereafter, ending July 16, 1918.

Ellicott Machine Corporation, Baltimore, Md. Twelve vertical triple-expansion marine engines.

The number of vessels of all types for which contracts have been let up to June 28 was 176. Of this number 110 were wooden vessels, 38 were steel, and 28 were of the composite type.

Contracts were distributed as follows, for wooden ships, 60 on the Pacific Coast; 46 on the Atlantic Coast; 4 on the Gulf Coast. For steel ships, 34 on the Pacific Coast; 4 on the Atlantic Coast. For composite vessels, 20 on the Atlantic Coast.

Brittain and Terry of New York, received the largest single contract, calling for 20 composite vessels. The honor of receiving the largest single contract for steel vessels is divided between the Seattle Construction and Dry Dock Company and the Moore and Scott Iron Works of San Francisco. The largest wooden ship contract has thus far been received by the Sloan Shipyards Corporation of Seattle.



MOTORSHIP "CHARLES BRALEY," OWNED BY SINCLAIR GULF CORPORATION, NEW YORK.
D. W. Capacity 4500 Tons, Equipped With Twin 500 h. p. Bolinders

CONTRACTS TO BE LET FOR DIESEL POWERED SHIPS.

Motorship is pleased to state that in the advices received from the Emergency Fleet Corporation, Diesel engines are to receive their due consideration, inasmuch as it was stated that they were to be installed in some of the ships building. This is supplemented by a letter from Theodore Brent, vice-chairman of the Shipping Board, in which he stated that a great many motorships will be used before the vast shipbuilding program, assumed, will be finished.

This is cheering to note, inasmuch as Diesel engine propulsion has until this time received but scant consideration at the hands of the board. This may have been due in a measure to the hastily prepared plans of the Emergency Committee, but it is due in the main to the lack of standardization of heavy marine oil engines in the United States. Each manufacturer of this type of engine had a different design, making it very difficult for the examining boards to favor them with more than slight consideration. A standard ship was needed and steam power was standardized to a high degree. In view of these things, it is indeed pleasing to Motorship that some contracts are to be placed for heavy oil engines.

Information was also received in the advices that contractors will be permitted to build their own type of steel vessel on plans approved by the board's naval architect. The standard plans for 7,500-ton, steel cargo vessels for construction on the Atlantic, Pacific and Gulf Coasts, and the plans for steel and wooden vessels to be constructed on the Great Lakes and in the interior will be ready for distribution shortly.

DOUBLE-ACTING DIESEL ENGINES

In 1911 Schneider & Co., of La Cruesot, France, had under construction a double-acting four-cycle type Diesel engine of 2,200-2,600 b. h. p., but it was of the horizontal class. Whether it was finished, or not, is not known, but the big experimental vertical single-acting, two-cycle Diesel engine of 1,200 b. h. p. at 150 r. p. m. was completed many years ago, and a number of test runs were made. Carels and Ghent assisted them in the design.

SKANDIA PLANT WILL MAKE WERKSPOOR ENGINES.

REALIZING the great immediate future that there is for the true Diesel marine engine and for the motorship on the Pacific Coast, an important San Francisco engineering concern, namely, the Skandia-Pacific Oil Engine Company, has just completed an agreement of international importance with one of the oldest engineering firms in Europe, namely, Werkspoor of Amsterdam, Holland, whereby they will build Werkspoor-Diesel engines on the Pacific Coast. This arrangement, however, will not interfere in any way with the output of Skandia surface-ignition oil engines, as the sizes of the Werkspoor-Diesel engines commence about where the Skandia motors leave off in power, so that the combined range of powers will vary from that for small work boats up to 15,000 ton ocean-going steel ships.

Werkspoor, whose full title is the Nederlandsche Fabriek van Werktuigen en Spoorweg Materieel (Netherlands Engineering Works) have had varied and extensive Diesel oil engine experience, and were the first company to install a marine Diesel engine in a sea-going motorship—(the "Vulcanus" built in 1910)—previous to which they had been building stationary-type Diesels for over ten years and marine steam-engines for nearly a century.

In 1697 Czar Peter, the Great, of Russia, worked for a year as a shipwright, their plant then being known as the East India Company, while on July 2, 1783, they astonished the world by launching three large wooden vessels in one day, namely, the "Sirene," the "Batave," and the "Doggerban," under the direction of Dirk van Haarst, the construction having been commenced on Jan. 2nd, Feb. 5th and Feb. 10th of the same year. Their marine steam-engine works alone employed one thousand men in 1847. Since 1910 they have placed in service 26 mercantile Diesel-driven ocean-going motorships.

About two years ago Josephus Daniels, Secretary of the U. S. Navy, suggested to Werkspoor that they devote their Diesel experiences to designing and producing a Diesel engine to propel submarines, because the U. S. Navy then were having so much trouble with the design they were using. This they acted upon and built at a great cost, a motor to the special requirement of the U. S. Navy Department. This engine undoubtedly is one of the best ever constructed and the makers state is far advanced in design of the famous Krupp engine in Germany U-boats. This was realized by two of America's largest battleship builders, namely the Newport News Shipbuilding and Dry Dock Co., and the New York Shipbuilding Corporation, who also succeeded in obtaining rights to build it.

The Skandia-Pacific Oil Engine Company now is ready to build this remarkable submarine engine for the United States Navy. Rear-Admiral Robert Griffin, Engineer-in-Chief of the U. S. Navy, has expressed most favorable comments on the highly developed design of this engine. Incidentally it also would make an ideal propelling plant for large submarine-chasers and for motor yachts. Many disinterested engineering experts have paid the highest compliments to Werkspoor Diesel engines, including Mr. Arthur West, of the Bethlehem Steel Company, (America's leading gas-engine expert), Capt. C. W. Dyson of the U. S. Navy Dept., Mr. George Armes of the Union Iron Works of San Francisco, and Mr. John Bogart of the American Krupp Diesel Engine Co. In a United States Government report (blue book) on the great engineering works of Europe it is stated that "there need be no hesitancy in stating that the class of workmanship at the Werkspoor Works is not excelled anywhere in Europe." In view of these facts the Skandia Pacific Oil Engine Company may be congratulated on making such a historic connection. At the present time over 5,000 men are employed at the Werkspoor Works and the principal manufactures are turbines, reciprocating engines, sugar machinery, locomotives, bridges, trolley cars, railroad coaches and Diesel engines, and they may well be termed the Bethlehem Steel Company of Holland.

Considerable extensions will be made, said Mr. J. H. Hansen, president of the Skandia Pacific Oil Engine Co., to our works in order that these engines may be turned out without interfering with our present large output of Skandia oil engines. A new building will be immediately constructed. This additional unit will be 250 feet long and 100 feet wide and higher than the present buildings in order to house the heavy machinery necessary for the construction of this new type of engine. A heavy electric crane of 25 tons capacity will be installed to handle the heavy parts. Heavy lathes, boring mills, and radial drills will also be housed here. A heavy, open-side planer is part of the new equipment. These additions will cost $200,000 and when installed, will make this factory complete in every detail, and representatives of the company state will be the best on the coast.

We shall have the assistance of experts from the Werkspoor works, while the designer's drawings will be followed without the slightest deviation, so that the engines will be exact duplicates in materials and construction of those built at Amsterdam. We are ready to accept further orders to give fairly quick deliveries. The negotiations between Werkspoor and the Skandia Co., were completed by Mr. T. Orchard Lisle, A. I. Mar. E., of New York City.

THREE PURSE SEINE FISHING BOATS FOR PACIFIC AMERICAN FISHERIES.
65-footers Built by Tregoning Boat Company, Powered with 50 h. p. Frisco Standard Engines and Launched at the Same Time.

A COMMUNICATION.

Motorship is in receipt of the following communication from the Engineering School for Advanced Instruction and Investigation at Columbia University, Department of the United States Navy:

June 18, 1917.

The Editor, Motorship, Seattle, Wash.

Dear Sir—Since the war started all the regular naval officers, assigned to this school for advanced engineering instruction, have been detached for active duty. The school is now being utilized for the training of the officers of the Naval Coast Defense Reserve of this district. These reserve officers include both deck and engineering divisions, and are being given an intensive course to fit them at the earliest possible moment for the responsibilities involved in operating the motor boats of the Coast Defense Flotilla. Naturally in an emergency of this sort, our equipment is inadequate and unsuited for the purpose, especially as to engines. While we have some small and medium size engines we have absolutely none of the larger sizes, which are at present the important ones, and it is necessary for the efficiency of the instruction that we secure some at the earliest possible moment. This short time element in our problem makes it impossible for us to get the assistance we need through the regular navy channels and I, as the person in charge of the engineering instruction, am appealing to you for assistance. Will you please call our need to the attention of all persons who may have engines in their possession of more than 100 h. p. capacity, and who might be willing to loan them to us for the emergency period. Such persons may send the engines without any formality direct to me at Columbia, delivering them to 118th St. and Broadway.

We confidently expect that as soon as the yachtsmen and motorboat men of this district realize our need they will come to our assistance, and I am, therefore, making this appeal through the leading Yacht Clubs and Motor Boat Journals. Anything you can do to assist us I need hardly say will be greatly appreciated, and will be a direct patriotic contribution to the needs of the moment.

Yours very truly,
CHARLES E. LUCKE,
In Charge of Engineer Division Instruction.

CHASERS SCHEDULE AHEAD OF TIME.

The submarine schedule is more than a month ahead of time according to the Navy Department. The department announces that nearly three times the expected number of 110-foot chasers will be delivered by August 1, according to present indications and that all of the large number of boats ordered are actually under construction.

The department has not announced the number of boats ordered but it is known, however, that several hundred of these swift, armed craft will be in service by January 1 of next year. The first vessel of the type was completed at the New York Navy Yard some time ago and is now under tests. The little vessel proved herself staunch and capable of carrying the armament specified.

The engines for these vessels will be ready to be installed as soon as the boats are launched.

HOLLAND PLACES ORDERS FOR SUBMARINES.

The Dutch Government has introduced a bill in parliament authorizing the construction at San Francisco of three submarines for the Dutch colonial navy. Each vessel will cost 2,800,000 florins, including the armament.

AUTOMOTIVE ENGINEERS IN THE UNITED SERVICES.

At its annual meeting just held in Chicago the National Gas Engine Association voted to affiliate with the Society of Automotive Engineers in engineering matters. Such a combining of interests is of great value to not only the manufacturer but to the using public as well, for through interlocking technical committees, immense resources of information and experience become available readily, and standardization that could be effected in no other way becomes possible.

NEARLY THIRTEEN THOUSAND OIL ENGINES

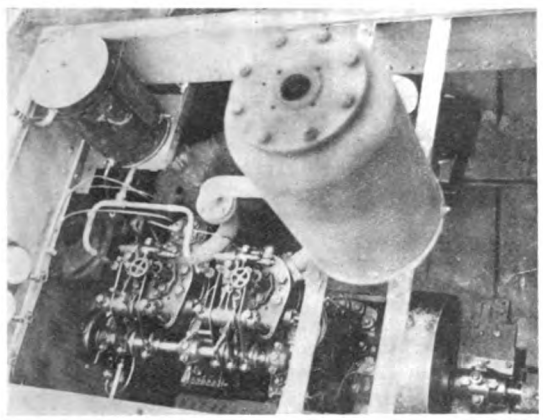
As an indication of the business that there is in oil engines Petters, Ltd., whose motors will soon be built in this country, have sold 12,930 engines, or 124,396 b. h. p., since they have been in business. This represents both marine and stationary sets.

DIESEL-ENGINED BARGE OF 120 TONS CAPACITY.

TOWARDS the end of the past year a very interesting installation was carried out in England despite the exigencies of war work, and which may form valuable information to American shipowners, particularly as it is not usual to install Diesel engines of this size, as surface-ignition oil-engines are more generally used for such low powers.

The barge in question, originally was built of steel in Holland, but is owned by Messrs. Albert Batchelor, Ltd., the Portland cement people of Clinkham Works, Halling-on-the-Medway, England. The Diesel engine that has just been installed was constructed in Switzerland so this vessel now is somewhat cosmopolitan. Whether or not the installation is a success may be judged from the fact that Messrs. Batchelor write Motorship to the effect that they would like to purchase from the United States, a Diesel, or "semi-Diesel" marine oil engine of 200 to 300 b. h. p. for another vessel. They also own a Bolinders-oil engined barge, so there seems to be a good reason for their desiring to continue with oil engines. Messrs. Batchelor, please note, do not ask to purchase a steam engine and boiler; but stipulate oil motors.

"Clinkham," which is the name of the barge, carries 120 tons of cargo, and measures 72 ft. over all, with 18 ft. breadth and 8 ft. draught loaded at aft, and 6 ft. forward. An unusual feature with a barge is the raising of the deck over the hold to flush with the rail for the full



ENGINE ROOM OF DIESEL BARGE "CLINKHAM."

width of the ship, the usual hatch being arranged on this deck. The exact width of the hull without rubbing bands is 17 ft. The cargo hold has a length of 30 ft. by the extreme width of the ship; while the forward 18 ft. is given over to the crew's accommodation.

Very little space is occupied by the machinery and fuel tank, this together being 15 ft., the after part of the engine-room being 7 ft. from the stern post. The Diesel engine itself is 6 ft. long from center to center of the two flywheels, 4 ft. wide, and 6 ft. high from the center of the crankshaft to the top of the valves.

This Diesel engine was built by Sulzer Bros., of Switzerland, and is in two cylinders, each 8" bore by 12" stroke, and develops between 40 and 50 b. h. p. at 300 r. p. m., although only rated as 30 b. h. p., and is of the open crank-pit four-cycle type. It is non-reversible, so drives the propeller through a mechanical reverse-gear and clutch, this mechanism being worked by a foot-pedal at the control station on deck, and by a chain-gear with hand wheel respectively. There is an entire absence of vibration and the speed obtained is good, while the engine is handled by a man who is not a trained-mechanic. For driving the auxiliary compressor there is a little gasoline-kerosene motor of the electric-ignition class. Slung up under the deck at the after end is a cylindrical fuel-tank of 300 gallons capacity, and there is a vertical running-tank fitted to the forward bulkhead. It is of interest to note that the main Diesel engine is started on kerosene, and when warmed up is changed over to crude-oil. This probably is due to the smallness of the cylinders, and possibly the compression is lower than usual. The photographs of the "Clinkham" are by the Temple Press, Ltd., of London.

Messrs. Batchelor also own a canal barge which originally was steam-driven, with twin screws. The barge is of steel construction, and recently was sheathed with wood, also a Bolinder surface-ignition marine oil engine has been installed. Her length is 72 ft. by 13 ft. 3 in., and she has a dead-weight-capacity of 70 tons on a loaded draught

THE DIESEL BARGE "CLINKHAM."

of 4 ft. 6 ins. The twin-screws have been retained, one being direct-driven through a clutch, and the other by means of a chain. They are 20 ins. in diameter. The motor is direct-reversible and develops 10 b. h. p. at 375 r. p. m. Two men form the crew of this barge, and one of them attends to the engine. T. O. L.

REINFORCED CONCRETE SHIPS.

THE problem that confronts our country of increasing the merchant marine requires the consideration of every possible method or material of construction. Several prominent engineers have suggested reinforced concrete.

This is not something new—a concrete schooner was employed for some years in the north Atlantic coasting trade, having been constructed in about 1898. The London Times mentions a small boat of reinforced concrete built by a Frenchman in 1849 and still in service after a test of 68 years.

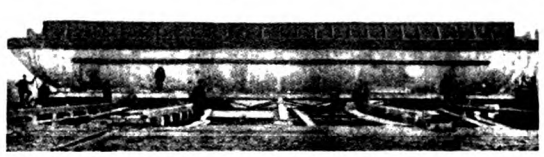
The concrete ship is only a further development of the concrete barge and such craft have been in successful use for years. Concrete lighters have been used for the past six years on Chesapeake Bay, supplying coal and water to dredges, carrying loads of sand and gravel, etc., and the accompanying illustration of a 500-ton lighter on the ways just before launching is typical of their appearance. With such a craft there is no necessity for caulking or painting, the upkeep is small and there is no danger of decay. Barnacles will not collect on a concrete hull.

A concrete barge has been in service on the Welland Canal since 1910 and has seen very hard usage. It has a length of 80 feet, a beam of 24 feet and is 7 feet deep. It is interesting that the walls which were constructed between forms are 2½ inches thick, reinforced with steel rods, yet the barge is used for carrying loads of stone, etc., with conspicuous success.

Since 1910 reinforced concrete barges have been built for use on the various sections of the Panama Canal and their experience has enabled the engineers to develop a very efficient type of vessel. Recently concrete pontoons were constructed for service as landing stages for boats up to 65 feet in length. These pontoons have a length of 120 feet, a beam of 28 feet and are 8 feet deep. They are very thoroughly reinforced.

Vessels which are more like ships than barges have been built of reinforced concrete in Norway. A report from the American Consul General at Christiania describes a plant at Moss, Norway, where motorships of 3,000 tons displacement are being constructed. They are being equipped with twin, direct-reversible Polar-Diesel engines each of 300 b. h. p. This company intends to build ships of this type up to 5,000 tons. The following quotations from the report indicate the extent of the work under way at that time:

"The inventor of this new style of vessel is said to be M. Nicolai Fougner, an engineer, who claims to be able to construct a ship of any size demanded. He is now building a lighter for a



120-FOOT CONCRETE BARGE.

mining company at Sydvaranger for the oversea export of iron ore and the import of coal. The vessel, having a displacement of 3000 tons, is to be ready before the end of the current year. It is stated that these concrete ships can be sailed or engined like other vessels, and experts consider that a new epoch in shipbuilding has arrived.

"The ship, which arrived in Christiania last month, resembles a large barge, and is constructed entirely of concrete with the exception of the ribs, which are of steel. This new method of constructing ships has attracted much attention. The Swedish Minister of Marine, M. Brostrom, one of Sweden's largest shipowners, immediately ordered a lighter of some thousand tons displacement, and he was present when the craft was launched at Moss. He was accompanied by four experts, all of whom expressed much satisfaction at the result.

"Two other lighters are now on the stocks, and a large slip for a 4000-ton craft is nearly completed. More than 200 men are now working in the new yards, and five lighters have been contracted for in addition to the one completed and the two on the slips."

In view of such examples proving the usefulness of concrete vessels of this character, it would seem wise to consider concrete in the construction of ships which are to increase our merchant marine to the proportions demanded by the present requirements. If sea-going barges were to be constructed, or smaller craft suitable for lake traffic, this would release for other purposes many ships now in use in this capacity. The presence of the necessary materials for a concrete vessel at so many convenient locations would make it possible to provide a large tonnage, and progress in construction would be faster than with ships of steel or even wood.

At any rate the subject is an interesting one, and Motorship would be glad to hear the opinion of some of its readers.

TO BUILD CONCRETE SHIPS.

In the past year there has been considerable discussion in regard to the feasibility of concrete ships, and now an experiment is to be made and a vessel of large size in this material is to be thoroughly tried out. The plans are made for an ocean going vessel and the originators of the project are McDonald & Kahn, of San Francisco. Comyn, Mackall & Co., of 310 California St., San Francisco, have lent support to the project and actual plans for the ship have been prepared by Leroy Caverly, a marine engineer of 465 California St. If tests now under way are successful, work on the vessel will shortly be commenced in Redwood harbor. As planned, this experimental concrete ship would be 300 feet over all, 46 feet beam, with a depth of 24 feet. It will have a gross tonnage of 5,000 and will be powered by steam turbines of 2500 h. p. It is claimed that such a craft would have a dead weight no greater than a wooden vessel of the same size. It is believed that a ship of this character can be completed in ninety working days at a cost of only $64 a ton. It is not probable that power will be installed at once, but that the hull will be towed on a sea trip to test her efficiency as a bottom. The greatest of interest in the project is manifest in San Francisco shipping circles and already tentative plans for organizing companies to build concrete ships are being seriously considered in various quarters.

TO BUILD SHIPS FOR FRENCH GOVERNMENT.

The Washington Shipping Corporation of Seattle has received orders for six 2600-ton auxiliary powered wooden hull ships to be built for the French Government, and the contracts have been signed. This is the first order to be placed on the Pacific Coast by a foreign government for merchant ships. The aggregate cost for the six ships exceeds $2,000,000.

To handle this contract, the corporation will lay two new shipways. Preparations are made for doubling the capacity of the plant if it becomes necessary. The standard plans of the Washington Shipping Corporation will be used for the construction of these vessels.

The new ships will be of 2600-tons, 250 feet long, 43 feet beam, 21 feet of depth. They will be equipped with surface-ignition type of engine, and will be schooner rigged.

These schooners are to be completed under survey of Bureau Veritas, and must be capable of taking the highest class rating for wooden ships.

JAPAN TO MAKE DEISEL ENGINES.

The Mitsubishi Dockyard and Engine Works at Kobe, Japan, has started construction on a new engine shop with the intention of manufacturing Diesel engines for land and marine purposes, especially for submarine boats, together with petrol engines for aeroplanes and motor-boats. The new shop is expected to be finished by about the middle of the year.

PLANNING OUT MOTORSHIPS.

A Few Notes for Prospective Shipowners.

AS yet shipowners have not become accustomed to the difference in the carrying capacities of motorships and steamships, and when planning out a new vessel, usually have in mind as a base a given dead-weight-capacity. We previously have pointed out how misleading this term is when dealing with motorships, and that a Diesel-driven ship of the same dead-weight-capacity as a given steamer will have a greater cargo-carrying-capacity.

Shipowners, too, must take into consideration the propeller speed, and, although horse-power always is horse-power, one engine of 500 b. h. p. will not necessarily give a vessel the same speed as another engine also developing 500 h. p., for the ship may not get the full benefit of the power generated. For instance an engine developing 500 b. h. p. at 300 r. p. m. will not give a sea-going cargo-ship the same average speed as a motor developing 500 b. h. p. at 150 r. p. m., even if reduction-gear be used.

We think that in certain trades there eventually will be built a large number of small steel motorships, as, while it does not often pay to operate small steamers, the same is not the case with small motorships, and a few suggestions along this line will not be devoid of interest.

Let us take as a suggested example a vessel required to call at ports where the depth of water is limited and makes a twin-screw installation a necessity. We will work on a freighter, the main dimensions of which were figured out for W. R. Grace & Co., namely, 200 ft. long by 40 ft. breadth and 10 ft. loaded draught. With a block co-efficient of 0.75 she would have a loaded displacement of about 1,715 tons. To obtain a sea-speed of 10 knots, eight hundred Diesel indicated-horse-power would be required, or equivalent to 700 steam i. h. p. This, provided the motors turned at below 170 r. p. m. during normal operating, and then a regular sea-speed of 10 knots would be assured. The cargo-capacity of this ship would be 1,000 tons, and the dead-weight-capacity about 1,100 tons, or a little over.

In order to get an accurate assumption of the machinery we have taken details of a well-known and thoroughly-tried four-cycle type of Diesel, the name of which is not important so far as this article is concerned.

However, each engine has four cylinders, 15¾" bore by 26⅝" stroke, and each develops 400 indicated h. p. at 160 r. p. m. on a weight of 36 tons (80,640 lbs.) at a mean-indicated-pressure of 90 lbs. per sq. in. The last could, of course, be increased a little without affecting the reliability of the engine, and a total of 900 indicated h. p. developed at 170 r. p. m. from the two motors, which would be equivalent to about 680 shaft h. p.; but when running at 160 r. p. m. reliability is absolutely assured, and the exhaust temperatures would be low.

Each engine, if desired to run at the higher power and speed, would drive a propeller 8 ft. in diameter by 9 ft. pitch with 16 sq. ft. of blade area; but if the lower power was used this would slightly be reduced. Together with propellers, shafting, stern-tubes, injection air-bottles (330 gallons capacity) starting air-bottles (220 gallons capacity) bilge-pumps, but without the auxiliary machinery, would cost at today's high prices round about $80,000. Auxiliary machinery weights and cost will be in accordance with the owner's requirements. However, the entire ship could be built today (including a substantial profit to the builders) for $180 per ton actual cargo-carrying-capacity, or under $200 per ton d. w. c., with about 14 months delivery.

The fuel-consumption when developing 800 i. h. p. and driving her at 10 knots will be 3.2 tons of crude-oil per 24-hour day, or per 240 nautical miles running. Therefore, with all auxiliary machinery the consumption at sea will not exceed 4 tons (28 barrels) per diem, or less than two-tenths of a barrel per mile. In port the consumption will be about 7 barrels per day. Therefore, for a radius of 5,000 nautical miles she will need a bunker capacity of 560 barrels (80 tons).

It is now easy to ascertain the main earning powers of such a vessel, also the fuel bill.

Let us say she makes 36 one-way voyages per annum, each voyage lasting seven days. If fully loaded each voyage it means that she will carry in one year 36,000 tons of cargo. With freight averaging but $12.00 per ton per round voyage, it means that her income from freight-receipts will be $432,000.00.

With crude-oil at $1.75 per 40-gallon barrel, 252 days at sea would mean 8,176 barrels, or a fuel bill of $14,308, to which must be added about $894 for 73 days port consumption (511 barrels). Hence the total annual oil-fuel bill really will be under $15,000, as we have allowed every day to be a working day and with fuel at $1.75 per barrel.

The following oil will do excellently as fuel, providing the starting of the engines, especially in cold weather is carried out on ordinary solar oil fuel of lower flashpoint.

California Oil.

Specific gravity	0.962
Flashpoint	245 degs. F.
Distillation, to 570 deg. F.	22½%
Percentages, 570-660 deg. F.	55½%
Residue	22%

What other operating expenses have to be deducted, shipowners will have better facilities than we have for figuring out. T. O. L.

DATA FOR NAVAL ARCHITECTS AND BUILDERS.

The recent placing into service of the Bolinder-engined tankers "Bramell Point," "Pennant," "Holden Evans," and "Chas. Braley," all built at Baltimore, reminds us that in 1914 the shipowning firm of Phs. Van Ommeren of Rotterdam accepted delivery of a large steel-built motor tanker also Bolinder motor-driven. This was the M. S. "Gallia," and the following details are more complete than usually are given with vessels, and designers in this country may find the data valuable.

Displacement (loaded)	2,200 tons
Dead-weight-capacity	1,113 tons
Gross tonnage	1,630 tons
Length	190′ 3″
Breadth	34′ 5″
Depth	17′ 8″
Loaded draught	16′ 5″
Power	680 brake h.p.
Engine speed	225 revs. per min.
Engines	Bolinders Hot-bulb oil engines
Speed	9 knots
Weight of two main engines	40 tons 16 cwt.
Weight of propellers and tail shafts	3 tons 12 cwt.
Weight of tanks and piping	3 tons 6 cwt.
Weight of auxiliary machinery	8 tons 17 cwt.
Weight of spares	4 tons 10 cwt.
Total weight machinery	61 tons 2 cwt. (136,864 lbs.)
Test-bed consumption (engines)	0.525 lbs. per b.h.p.
Engine consumption in ship	0.460 lbs. per b.h.p.
Fresh water consumption	00.72 lbs. per b.h.p. hr
Power of distillation apparatus	3 b.h.p.
Power of auxiliary engine	10 b.h.p.
Power of deck auxiliary engine (windlass)	10 b.h.p.

It will be noticed that the engines consumed more fresh water than fuel; but with present-day Bolinder oil-engines (and with other makes) the internal water-drip has been abandoned so that the fresh water supply no longer is required.

DISPENSING WITH AIR FOR FUEL-INJECTION.

For the last batch of sumbarines the U. S. Navy Department endeavored to dispense with the air-starting valves for the Diesel propelling engines, the main idea apparently not being to do away with the air-compressors (for air was needed for fuel-injection, and for firing the torpedoes) but to simplify the cylinder-head construction, and reduce the number of orifices in the casting, thereby assisting to prevent the cracking of the heads.

It was evident that the naval engineers who drew up the specifications or who made the recommendations, overlooked the fact that in actual practice the Diesel-type engines that have given the most reliable results under severe conditions, have four openings, and that one badly-designed orifice in a cylinder-head is far more undesirable than four or five good openings. To put it plainly, the manner in which the head is arranged and designed, the amount of heat to which it is subjected, the arrangement of the cooling-water channels, and the methods adopted in the foundry when casting, are far more important than the number of openings. The writer knows of cases with big marine Diesel engines of the mercantile-type where there has been less than ½ in. space between the exhaust-valve and the fuel-injection valve; while with another design, but with the same cylinder diameter, there is not less than four inches between all valves. The different results to be expected are too obvious to need putting in cold print.

The U. S. Navy Department's new policy, as above, calls to mind that several years ago Vickers Ltd., who have built practically all the submarines for the British admiralty, dispensed,—not merely with air-starting arrangements—but with compressed-air for fuel-injection. This was an important step, because highly compressed-air and its mechanisms, such as compressors, intercoolers, piping, and storage tanks, gives not a little bother, although everything serious pertaining to this has now been overcome by Diesel engineers. Still, it means that the propelling machinery is independent of compressed -air, other than that formed in the working-cylinder for combustion purposes.

Greatest secrecy regarding the mechanism of her submarines always has been rigidly maintained by the British naval authorities; but, among engineers details of new devices often leak out; hence the writer is enabled to mention that it was in 1912 that they first dispensed with air for fuel-ignition with submarine-type Diesel engines. Of course, the system adopted by no means gave such good fuel economy as air-injection, so hardly is likely to be adopted for mercantile motorship machinery. Whether this or a similar device is still used it is not possible to say, although it is so far as the writer can ascertain.

The system adopted by Vickers was invented by James McKechnie, their technical-director, and consisted of a single spring mechanism. The usual form of the plunger-type fuel measuring-pump was used. In the usual Diesel design, this pump delivers a certain quantity of fuel-oil to the plunger, and generally is governed by holding open the inlet-valve of the pump during a portion of the delivery stroke.

With McKechnie's system, however, instead of delivering the fuel to the ordinary pulverizer-valve, the measuring-pump delivers the liquid above a non-return valve, a space at that point forming the barrel of a small force-pump. A powerful coil-spring forces the pump-plunger downwards, the spring, which is in compression, being released by an acute-angled-cam device just at the correct moment. The cam, of course, is operated off a small lay-shaft on the engine. With this device anything from 2,000 to 6,000 lbs. per sq. in. pressure is supposed to be obtainable, and the sudden reduction of pressure when the oil enters the combustion-chamber is said to be sufficient compensation for the absence of air entering with the fuel and assisting in its vaporization. The enormous pressure is assisted by the spray holes being properly proportioned.

The same designer modified this device, and in the modification the coil-spring was replaced by a pneumatically operated piston. On the down stroke air is drawn above the piston through the non-return valve, and this air is compressed to a very high stage by means of the cam lifting the plunger. When the sharp angle of the cam suddenly releases the piston, it is driven smartly down and the fuel injected in a similar manner as with the spring coil. To avoid hammering action an air-cushion is furnished by means of a passage in the barrel that carries the pneumatic piston.

EARLY DIESEL-DRIVEN SUBMARINES.

France is said to be the pioneer of Diesel-driven submarines; but one of the earliest of Diesel-driven submarines was the Russian Navy submarine "Minoga,"—a boat of 117 tons, which was completed in 1909, or about eight years ago. This vessel had two Nobel-Diesel crude-oil engines developing 120 b. h. p. from three cylinders, 10-53/64 ins. bore by 11-13/16 ins. stroke at 400 r. p. m. These little engines had an average thermal-efficiency of 40%, a mechanical-efficiency of 75%, the brake-thermal-efficiency being 30%. The fuel consumption was 0.46 lbs. per b. h. p. hour on gas-oil of 18,000 b. t. u. calorific value per lb. The tests of these engines were made in 1908. In the same year (1909) the "Akula" was put in service. She was a Russian submarine of 360 tons, and her three Nobel-Diesel engines aggregated 900 b. h. p.

CONVERTING SUBMARINES TO DIESEL POWER.

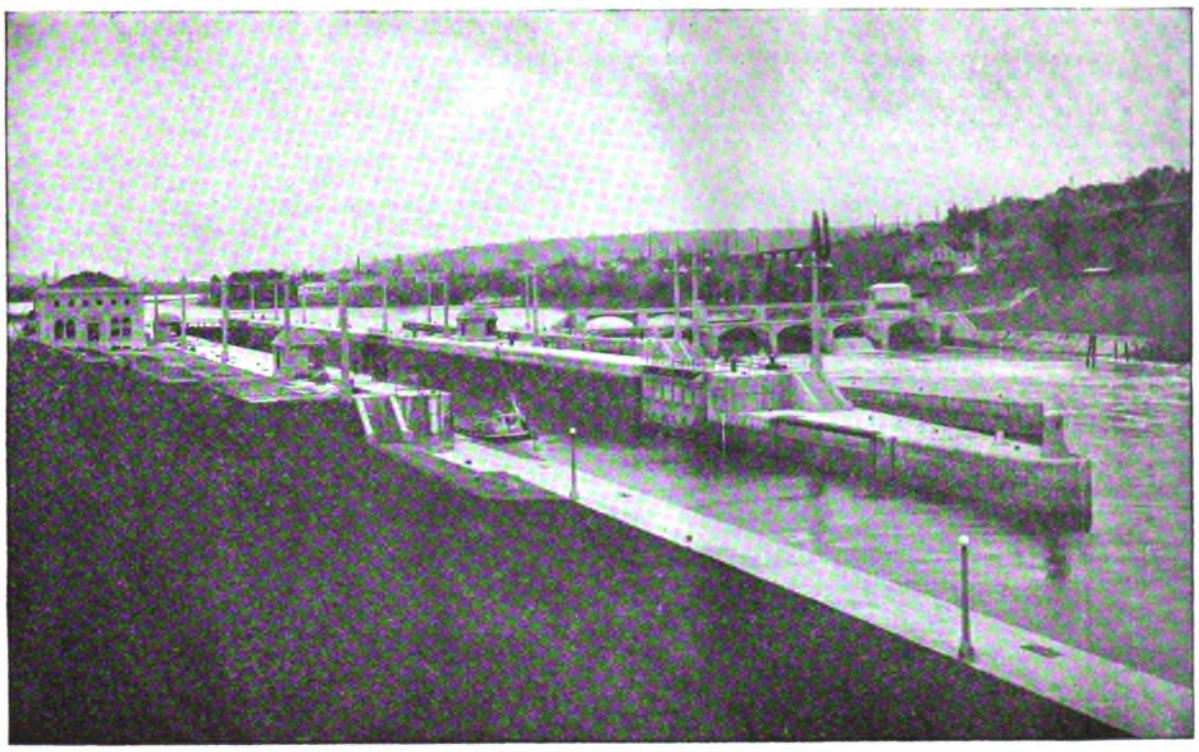
Some years ago the Electric Boat Co. of America built and supplied the gasoline-driven submarines "Bjeluga," "Peskar," "Losos," "Som," "Schuka," and "Sterlett" to the Russian Admiralty. Shortly after the gasoline motors were ripped out and replaced with six-cylinder Nobel-Diesel crude-oil burning motors. Each Diesel engine developed 160-180 b. h. p. at 440-500 revs. per minute, from six cylinders 8⅞ ins. bore by 11 13/16 ins. stroke on a weight of 5,936 lbs., or a little over 33 lbs. per b. h. p. This is remarkably light, but Nobels even have built lighter Diesel type marine engines.

BABY SUBMARINES.

Several years ago the Russian Admiralty completed three 50-ton submarines, in which were installed 50 b. h. p. Nobel-Diesel crude-oil engines. They still can be seen in operation on the River Neva at Petrograd.

Tne Lake Washington Canal

When the Lake Washington Canal is opened many builders of vessels of all types will be accommodated by reasonable operating sites and a result will be the stimulation to an extent of the motorship building industry, inasmuch as the Northwest is one of the largest and most rapidly growing motorship centers in the country.



LAKE WASHINGTON CANAL LOCKS.

THE Lake Washington Canal, joining Puget Sound with Lake Union and Lake Washington, forming a great inland waterway, navigable to deep-sea vessels of all types, and creating an inland harbor and fresh water basin of these lakes and waterways, is to be formally opened on the Fourth of July.

Conceived by a United States Army engineer, sixty years ago, the work was completed by a member of the same corps, Lieut. Col. J. B. Cavanaugh. Col. Cavanaugh has commanded a wide interest in his successful meeting of the engineering problems, and commendation in his executive direction of the undertaking. General H. M. Chittenden, U. S. A., retired, had much to do, when in charge of the engineer's office in Seattle, with the preparation of the canal plans as finally followed. The Government made its first appropriation for surveying the route in 1890.

The construction of the lock, which makes possible the raising of ships from sea-level to the level of the lakes was commenced November 10, 1911.

Traffic has been passing through the locks from Puget Sound to Lake Union since last August. On the Fourth, the day of the celebration, the system of locks and canals will be completed through to Lake Washington.

Plans have been made for a large military parade and a water pageant in which prominent Federal and State officials will take part. Invitations have been issued to the several yachting and motor boat clubs, the shipping men of the Northwest, and to the fishing fleets of Puget Sound, all of which will be well represented in the water carnival, joining in a parade through the locks, the canal, Lake Union and the continuance of the canal to Lake Washington.

The committee which has charge of the opening, is composed of the following men: J. S. Brace, chairman; Commander Miller Freeman, N. M. W., State Senator Dan T. Landon, Josiah Collins and Daniel L. Pratt.

Description of the Canal and Locks.

The locks are capable of lifting larger vessels than any similar structure built by the United States Government, excluding the Panama Canal. They are situated at the entrance of the canal. The main chamber of the lock will handle any ship that has ever been on the Pacific. It raises a boat from salt water to the surface of the chain of fresh water basins, thus created and retained, at a level 9 feet above high tide.

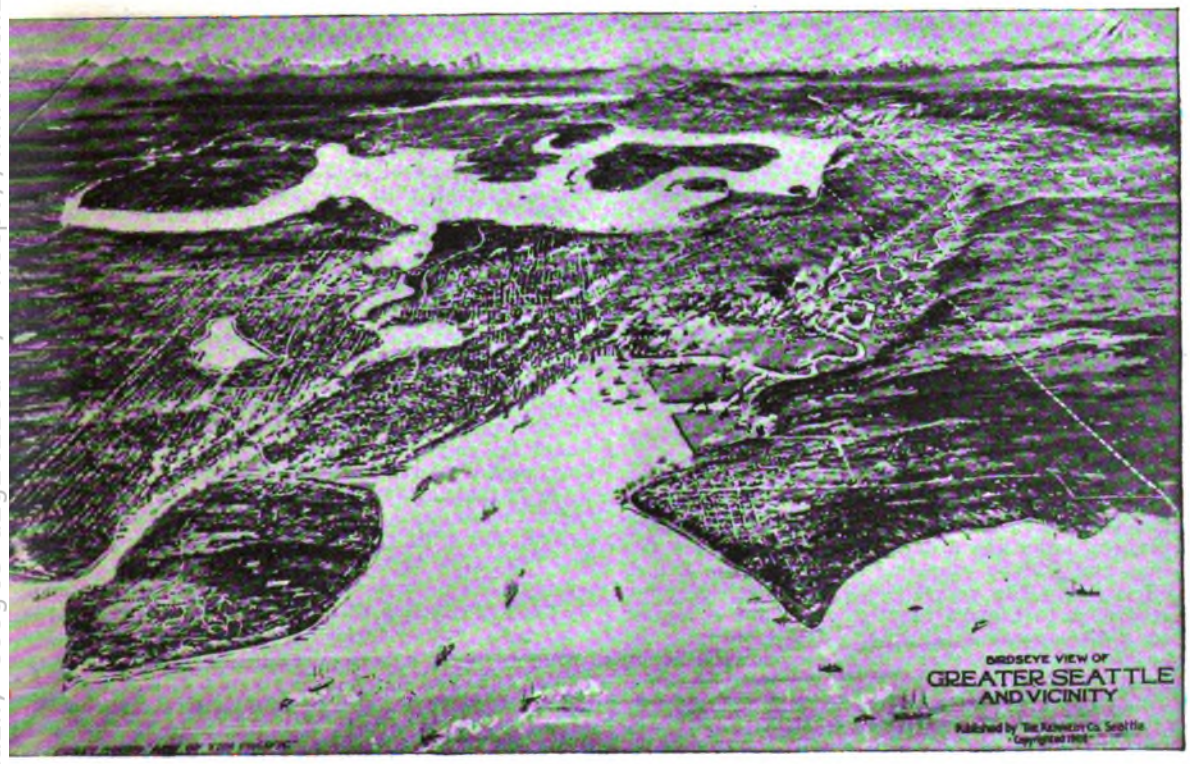
The walls of the canal lock are 55 feet high, 50 feet wide at the bottom, and 8 feet wide at the top. Two hundred and thirty thousand yards of concrete were used in their construction. There are two chambers in the lock; one for large vessels and the other for smaller craft. The larger is 825 feet long and 80 feet wide and holds water to a depth of 50 feet. The smaller chamber is 150 feet long and 30 feet wide. A boat can pass through the larger lock in twenty minutes, and through the smaller one in from five to ten minutes.

Lake Union is about two miles long and a half a mile wide. Lake Washington is more than twenty miles long and is from two to four miles wide. Between these two lakes a canal has been excavated 100 feet wide and 35 feet deep. Four million yards of earth have been dredged and excavated. The aggregate cost of right-of-way, damages, locks, excavation, revetment, and other features approaches $5,000,000. The outlay necessary in the construction of bridges, sewer and water tunnels, the changing of street grades and property grades is large.

Benefits of the Canal.

The completed canal is recognized as having a great military as well as commercial value. The effects of fresh water on barnacle-laden hulls is known by all, and because of the good anchorage to be found in Lake Washington, warships, transports, and other Government vessels while not in active service will most likely utilize this area. Fishing boats and similar craft will be attracted to Lake Union because of the fact that there is no tide there. They will be able to find an excellent harbor in which they can lie while outfitting or during the winter or dull seasons. The lowering of the lake has ended the possibility of floods in parts which were affected heretofore by winter rains. It has made possible large areas suitable for manufacturing sites, some of which have already been utilized. Shipbuilding, now one of the leading industries of the Northwest, will be aided greatly by this new addition to harbor facilities. Lumbering will be aided materially as will also be coal-mining. It will make for the city of Seattle, a shore line of approximately 130 miles.

As the gateway to Alaska and the Orient, the Northwest is preparing for the days to come, by these vast improvements.



BIRDSEYE VIEW OF THE LAKE WASHINGTON CANAL.

NORTHWEST BUILDERS ORGANIZE.

The Northwestern builders of wooden ships, at a meeting held June 20 at Seattle, banded themselves together into a permanent organization to be known as the Northwest Wooden Shipbuilders' Association.

This association will have on its rolls all the shipbuilders of the Northwest, and was formed for the purpose of building up a great wooden shipbuilding industry and to best utilize the timber resources of the Northwest, and its capital and labor.

A committee was appointed by the president to assist in the selection of various committees, which among others will be committees on plans and specifications, labor supply and wages, information and service, supply depot and machinery, yards and equipment, United States Shipping Board contracts, lumber and legislation.

President Griffiths describes this association as "an organization to act directly in the earnest and sincere construction of wooden ships."

Movements of this kind should receive the support and consideration of everyone in this business.

McINTOSH & SEYMOUR BUSY.

The McIntosh & Seymour Corporation, of Auburn, N. Y., builders of marine Diesel engines, subscribed to $100,000 worth of Liberty bonds during the recent campaign. This concern now has on order 22,000 b. h. p. in marine engines. This represented the motive power for 22 merchant ships, all the orders being for 500 b. h. p. sets in pairs.

The Giant Hydro-Aeroplane

A Possible Effect of the War

By DONALD V. HOTCHKISS, A. M. I. N. A.

The following article by Mr. Hotchkiss will prove interesting to Motorship readers. Mr. Hotchkiss, who is a well known writer on internal combustion engines, and who has from time to time contributed to Motorship is thoroughly familiar with the subject at hand. He is at present on active duty in the British submarine patrol service.

IF the rate of practical scientific progress of the world could be represented by a "curve," it would probably be found that as the present rate of progression exceeds that of the past, so we may calculate on still greater acceleration in the future.

This is in some sort admitted by the noticeable increase of faith given to scientific prophets of the present day, as compared with the mistrust of anything new, so characteristic of the past. Amongst the few advantages which the present war may be expected to bring to civilization, that of rapid scientific achievement is one of the most important, and several directions in which progress may be expected are already clearly marked.

Amongst the remarkable situations created by hostilities is the submarine campaign. Briefly, the rudiments are as follows: An empire whose members are divided by the sea must expose its supplies to the attack of machines which cannot, in the ordinary meaning of the word, be attacked in return. Further, no protection is really sufficient to ensure safety. Two methods remain, therefore, by which the matter may be equalized, either an invention must be forthcoming by means of which the submarine can be rendered innocuous, or else supplies must be carried through a region in which submarines cannot operate.

It seems probable that both solutions to the problem may be forthcoming simultaneously.

As regards the first; the matter, reduced to its basis, is a question of locating submarines. The means of administering the deathblow are many, and are so easily handled, that the present state of progress may be considered to cover the needs of the moment. As regards the location of submarines, however, the following points should be borne in mind. To be thoroughly effective, the invention must take the form of an instrument carried on each surface ship capable of giving the exact direction and distance of any submarine in the vicinity, whether at rest or in motion. Whether such an instrument, when found, will depend upon the medium of the other, is a matter of conjecture. It is, however, a fact, that the subject is under the careful consideration of some of the most capable scientists of the day.

In the event of failure on the part of these scientists, what is the alternative?

Figuratively speaking, it means that the main highways of the earth will be used at the risk of encountering foes lurking in ambush, as were the main roads literally, at one period of history. It is conceivable that in the event of the air becoming as navigable as the surface of the ocean, the latter might cease to hold its important place as a road from one country to another. The ocean, in spite of the reverence we attach to it, can hardly be said to furnish an ideal pathway, for it is very inconstant in surface configuration, admits the passage of any body only by the expenditure of considerable force in overcoming friction, and is in reality subservient to the force of the air.

The alternative seemes to demand a careful consideration of air transport. Let us, therefore, see how far we have gone in preparing a pathway through this higher substance in which no enemies can be hidden.

According to statistics (and I am not an authority on these matters), by using the principle of buoyancy we can carry in the air and propel at a speed of 100 miles per hour, about 1 ton with the expenditure of 9¼ b. h. p. That is to say, an airship of 700 feet in length with engines of about 1200 H. P. might be expected to carry roughly 131 tons at 100 m. p. h. in still air. If this is true, and I am quite willing to admit the matter is open to doubt, it means that the efficiency of the airship is roughly as 1 to 2 as compared with an ordinary merchant steamer of 3940 tons displacement, driven by engines of 1500 h. p. and carrying a deadweight of 2350 tons at 11 knots.

The airship of today is no doubt the best representative of a cargo carrier that aeronautics has yet produced, and in spite of its inherent faults, chief amongst which is the necessarily enormous bulk, it may in some modified form, be the link between butterfly aircraft and serious cargo carriers.

It may be asked in what manner this subject is connected with motor ships. In answer, a number of points may be put forward. In the first place, motor ships and practical aircraft have come into existence during the same period of evolution. Secondly, the improvements expected in both cases may follow the same lines, for just as the hydroplane principle as applied to water craft is developing rapidly, so with air craft, the same principle seems destined finally to supersede the more clumsy method of depending upon a lighter-than-air structure. Further, the use of aerial propellers, although a matter of convenience only, and applied principally in exceptional cases at the present time, gives every indication of being developed on grounds of pure efficiency. The use of the word "ship" in its narrow sense has already disappeared, and the near future may well give birth to craft embodying some of the characteristictics of all the present day experimental craft.

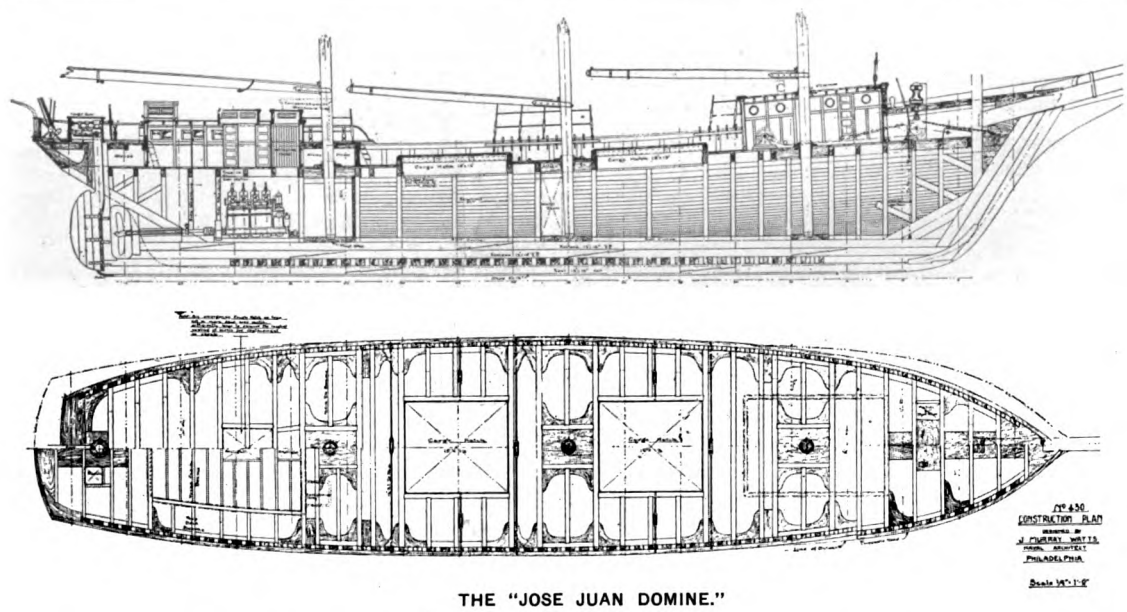
An inducement to progress along the lines indicated, lies in the simple fact that air offers extremely little friction as compared with water, that its elasticity may be utilized to minimize loss in the passage of bodies through it, and that craft capable of using it as a supporting medium may pass over and be made capable of resting either on land or water.

Reverting to another aspect of the subject, the question of dimension is interesting. Ships, from their infancy, have increased in size continuously. The reasons for this are probably the following: First, it has been found that the larger a surface ship is made, the less susceptible she becomes to surface disturbances. Secondly, the natural economical speed increases in the proportion of the square root of the length for "similar" ships. Thirdly, it is generally the case that fewer men are required to work the ship per ton carried. Lastly, a more refined machinery, navigating and signalling equipment can be installed without extravagance.

To set off these advantages, there is the ponderous nature of docking operations and the difficulty of arranging all business to suit the great event of the ship's sailing. When the question of waves need no longer be considered as in the case of craft traveling above the surface of the sea, it will probably be found much more convenient to employ smaller vessels of much higher speed, vessels in fact, which by increase in numbers and speed will perform an equal amount of work in a more convenient manner.

A curious analogy exists in the case of a railway train and a fleet of taxicabs. In the early days of the railways in some countries, independent motor cars would have been impossible on account of the rough roads. So, at the present time, it is unusual for small motor yachts to make ocean passages. With the general use of air craft, however, this disadvantage will probably disappear, for airmen tell us that high speed is a safeguard against natural air disturbances.

Although these ideas may not materialize during the years immediately following the war, a recognition of the probable trend of the future may serve to remove some of the obstacles which are continually placed in the way of new ideas by the more matter-of-fact practical men of the present day. Clearly marked lines of demarcation are not only useful, but necessary in the practical application of our present scientific knowledge, but they are difficult to find in nature. Since the main arguments of naval architecture and engineering are concerned with the uses of natural laws, therefore, it is unwise to regard the conventional boundaries which stretch into the past as guiding rails extending far into the future.



THE "JOSE JUAN DOMINE."

SPANISH DIESEL-DRIVEN AUXILIARY.

Spain is one of the countries where the mercantile motorship has made little, or no, headway, and this probably is due to there being no marine oil engine manufacturers in that country. In view of this situation the drawings we give of a 150-ft. wooden auxiliary schooner now building by the Valencia Shipbuilding Co., of Valencia, Spain, for Romani y Miquel, of Valencia, Spain, from designs by J. Murray Watts, of Philadelphia, will be of interest. This vessel will be used in trading between Valencia and the Spanish African colonies, and is adapted for carrying barrels of wine, raisins, etc. She has a cargo capacity of about 450 tons and will be propelled by a 200 h. p. Diesel oil engine. The vessel is being built throughout according to Lloyd's requirements, and is rigged as a three-masted schooner. Besides the main propelling engine there is a complete outfit of auxiliaries, including a 10 K. W. electric plant, which operates the electric capstan and electric winches. The name of the vessel is to be "Jose Juan Domine" and she will register at Valencia, Spain.

A PLAN FOR STEAMSHIP OWNERS.

Ship owners can do much towards the production of good motorship engineers. They can send the promising young engineers in their steamships to oil engine works, where marine Diesel motors for new ships are being constructed. The owners would be amply rewarded by this policy, since they would then have at their disposal men, already in their company, capable of acting as engineers in motorships or steamers as may be required, and with the mixed fleets that are now prevalent this is a distinct advantage.

TWO VESSELS FOR THE W. R. GRACE COMPANY.

The auxiliary schooner "Santa Christina," built by the Aberdeen Shipbuilding Yards, of Aberdeen, Wash., for W. R. Grace & Co., was launched June 14. A sister ship, the "Santa Isabel," was launched at the same time from the yards at Hoquiam, Wash.

W. R. GRACE & COMPANY CHARTERS MOTORSHIPS.

The Seattle office of the W. R. Grace & Co. on June 19 closed negotiations for the charter of the wooden-hull auxiliary-powered schooner "H. C. Hansen," now under construction in the Seaborn plant in Tacoma, Washington. She is to be delivered to the company in thirty days and will load 1,500,000 ft. of lumber from either Puget Sound or Gray's Harbor for a distant port. This vessel is owned by Capt. H. C. Hansen of Norway.

The Seattle-built auxiliary-powered schooner "Tacoma," owned by the Pacific Motorship Company of Norway, is another of the Grace Company's charters. While loading lumber in Tacoma this vessel tuned up her engines and her starboard propeller was broken on a floating log. She then was taken back to Seattle, discharged part of her cargo and drydocked at the plant of the Seattle Construction & Dry Dock Company, where a new wheel was installed. She will go back to Tacoma to complete her cargo, taking 1,000,000 ft. all told.

Another recent charter by the Grace Company was the Motorship Guanacaste, now under construction in Portland, Oregon, for M. T. Snyder of Mobile, Ala. She has a lumber capacity of 500,000 ft., and will be used in carrying lumber from Puget Sound.

TOSI DIESEL ENGINE IN ROYAL ITALIAN NAVY.

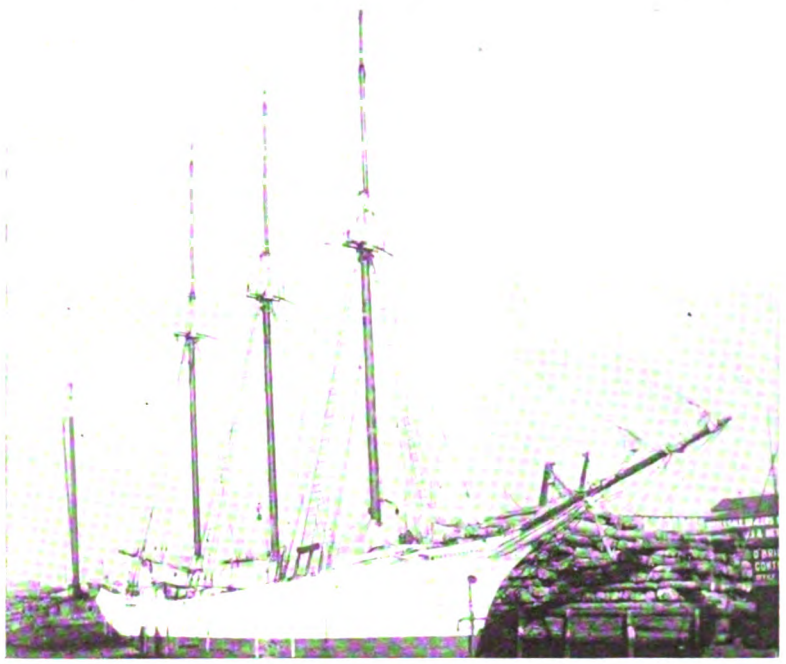
Some months ago the Franco Tosi Company, of Legnano, Italy, built three marine Diesel engines, each of 400 b. h. p., from their own designs, and these were installed in a 100-ton tankship belonging to the Royal Italian Navy. During the war we are unable to publish any illustrations or drawings regarding this vessel, but we have been advised that these engines are operating with the best results.

The Tosi Company have also built some submarine-type Diesel engines, and at the conclusion of the war it is Motorship's intention to publish details. In the United States the Tosi-Diesel engine is constructed by the Fulton Iron Works.

DOAK GAS ENGINE CO.

The Oliver Mfg Co. of San Francisco has been permitted to sell 600 shares to the Doak Gas Engine Co. of Oakland, 599 shares to L. Oliver and 296 shares to W. L. Oliver at par, $10.

Auxillary Motor Scnooner "Gilbert Islands"



A CANADIAN BOLINDER INSTALLED MOTOR SCHOONER.

Of considerable interest to shipowners and marine engineers, particularly in view of the current development of motorship construction is the "Gilbert Islands," which went into service a little over a year ago. Built at Liverpool, Novia Scotia, she is a vessel 125 feet in length, 31 feet beam and 11 feet 9 inches depth of hold, with a deadweight capacity of 650 tons. The auxiliary machinery consists of a two-cylinder 80 h. p. Bolinder engine which drives the vessel 7 knots, and was installed at New York. There is also a 5 h. p. Bolinders engine up forward connected to the anchor windlass. The vessel left New York for Sydney, Australia, with a cargo of petroleum and completed the voyage of 14,000 miles in three months, being somewhat held up on account of the Panama Canal slide. She is owned by the Ti Sang Company of Sydney, Australia, and is used for trading among the Gilbert Islands in the South Seas, and she has given very successful and economical service.

ARGENTINE GOVERNMENT NEEDS OIL ENGINES.

Owing to a shortage of coal the Argentine government is considering the conversion to auxiliary oil-engine power of a number of sailing vessels owned by their Navy Department, and if this decision is definitely made, will need a large number of marine crude-oil engines.

Experiences With Diesel-Driven Motorships

By C. Zulver, of the Anglo-Saxon Petroleum Company.

(There is left no vestige of doubt that the Diesel-propelled ship has proved herself, for certain types of motors built by experienced makers and properly handled, an undoubted success . . . As regards reliability our motor-vessels have over and over again made round-the-world trips covering up to 25,000 miles, making long non-stop runs in all weathers, without the slightest difficulty and showing perfect reliability.)

The Anglo-Saxon Petroleum Company own a large fleet of steamers and motorships, their big Diesel-driven vessels amounting to about one dozen bottoms, so no one is in a better position to give an opinion of authority on their respective merits than is Mr. C. Zulver, the Marine Superintendent of the Anglo-Saxon Petroleum Company, of London. In the following article Mr. Zulver makes some very definite statements which should most seriously be regarded, as it perhaps is in the interests of oil companies to "boost" oil-fired steamers, so it will be seen that his facts are unbiased and honestly recorded. We express our appreciation of the courtesy of The Shipping World for the following.—Editor.

AS is well known, for the last eight years the method of propulsion by means of Diesel and other types of internal combustion engines has been developed. Valuable data and records are now available, to which the writer has access. Having been in close touch with the construction, running, and maintenance of motor-propelled vessels, it has been proved that their reliability, cost of operation, and maintenance in every respect compares very favorably with steamers. These vessels, in fact—particularly in these abnormal times—have been found to be of incalculable advantage in certain trades.

For the same weight of fuel bunkers, in comparison with a steamer burning coal, the motor vessel can travel four times the distance. It involves that where a vessel on coal would have to bunker on a Transatlantic voyage to reach the United Kingdom, the Diesel vessel could make two round voyages on the same weight of oil, or would, naturally, make one round voyage without bunkering in the United Kingdom, and carrying extra cargo equal to half the weight of bunkers required by steamer for one trip across, which saves from 300 to 1,000 tons or more, according to the size of the vessel. **This has in actual practice resulted in enormous saving.**

Difficulties have naturally been experienced with motor-propelled vessels; it could not be otherwise. But with the experience now gained, the introduction of better designs, the use of better material—especially cast iron—there is left no vestige of doubt that the Diesel-propelled ship has proved herself for certain types of motors, built by experienced makers, and properly handled, an undoubted success.

As large users and managers of motor-vessels, we have no hesitation in saying that the motor-vessel will be largely developed immediately there is a return to normal conditions. The cost of the manufacture of Diesel motors will be a matter which requires the serious attention of the makers and engine builders. Improved designs will be introduced, the ideal being to develop a simple single-screw motor, with, say, four cylinders, developing up to 4,000 h. p. This motor, developed and made in certain standard sizes, would cover a large range of merchant vessels, and give speeds which have so far been considered most economical for commercial purposes.

It is only the heaviest asphaltic-oil fuels, which contain incombustible matter and ash, which cannot be successfully used in Diesel motors, but with the improvements of sprayers and atomizers, heavy, cheap oil of varied descriptions can be used successfully.

It is hoped that the British shipping community will realize the advantages of the motor-vessels; and although there have been a few failures with these ships, it is an undisputed fact that, where the right design and construction of engine has been adopted, this method of propulsion has been an unchallenged success, in reliability and reduced cost of operation.

At one time it was thought that the Diesel engine could only be used with particular advantage for oil-carrying vessels, but experience has not confirmed this view. In fact, it can be said that the motor-propelled ship is of particular value for general cargo vessels, which, as a rule, are longer in port handling cargo, when the engineers have a better opportunity to maintain their machinery in a satisfactory state of upkeep.

As regards reliability, it might be mentioned that over and over again our motor-vessels have made round-the-world trips, covering up to 25,000 miles, making long non-stop runs in all weathers, without the slightest difficulty, and showing perfect reliability.

With regard to the fuel consumption of the Diesel-engined vessels, the following compilation shows comparative results of Diesel-propelled ships and steamers. These figures are a mean of a large number of voyages for different types of ships, and are the results of actual experience, and therefore reliable.

Comparison Between Diesel-Engined Vessels and Steamers Burning Coal.

Dead weight Tons.	Type of Engine.	Total consumption per day on coal Tons.	Average Speed. Knots	Possible distance to run without replenishing bunkers. Knots.
5,220	Triple Exp. Forced Draft	2 5	9 5	5 9 5 0
4,995	Triple Eng. Natural Draft	25	9.0	5,8?0
5,010	Triple Eng. Natural Draft	25	8.2	5,020

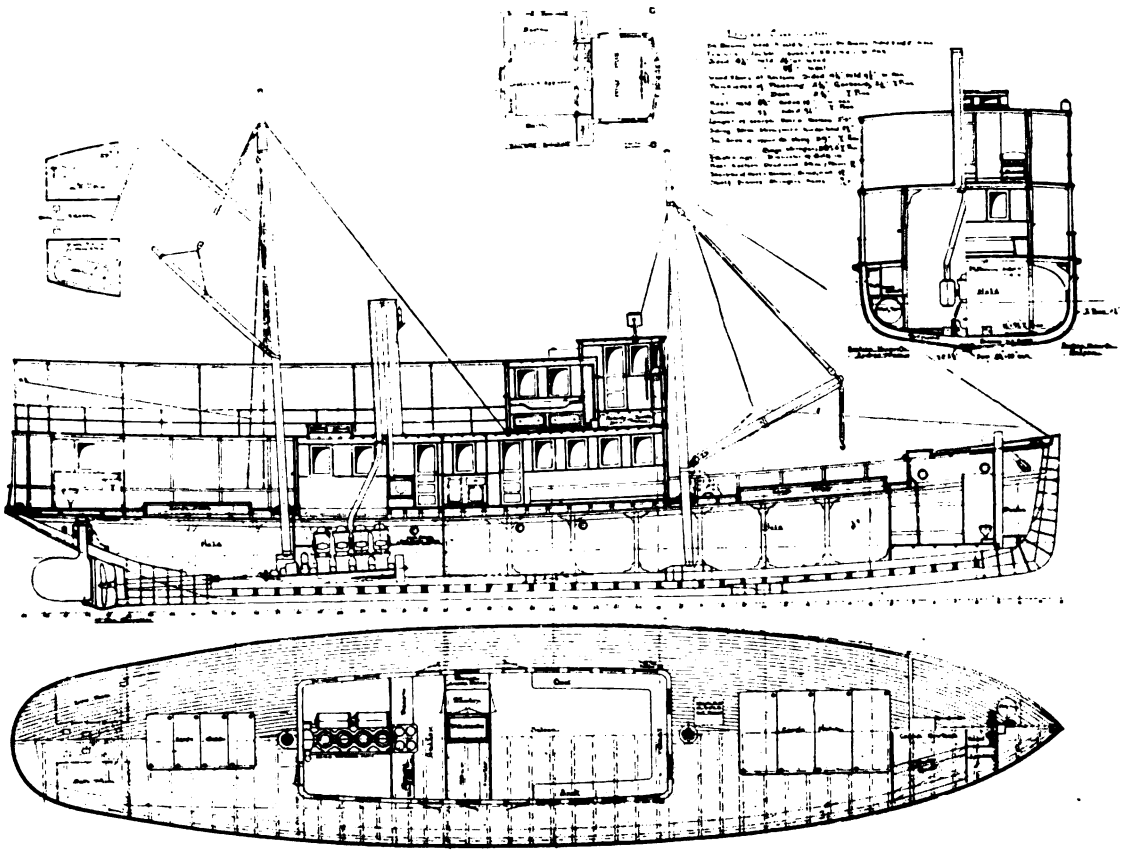
Tons.	Liquid Fuel	Tons.	Knots	Knots.
5,140	Diesel	6.35	9.14	26,790
5,140	Diesel	6.5	9.2	26,300
5,279	Diesel	6.6	9.2	27,500
5,170	Diesel	6.8	9.2	22,400
2,610	Diesel	5.0	8.6	14,420
1,215	Diesel	1.7	7.5	20,900

These figures speak for themselves.

An important advantage in the matter of economy in fuel consumption is that with the motor-propelled vessel there are no standby losses for banked fires, etc., as in the case of steamers. There is no raising of steam several hours before the ship's departure. With the starting of the main engines the consumption of fuel commences, and stops when the engines are rung off in port.

Where the British shipowner and engine builder have always maintained a position of prominence in the world's markets and commerce, it is a matter of regret that where the use of oil fuel, the development of motor-propelled ships, **and the construction on a large scale** of powerful marine internal-combustion-engined ships is concerned, there has not been that progress and enterprise which would assure to this country its leading position. Lately voices have been heard and steps have been taken which would indicate that in this respect we may, fortunately, anticipate much improvement, and we feel sure that when once the position is appreciated, and the task is taken in hand with energy, British enterprise will again take a leading part in a matter of great national importance. (The advice Mr. Zulver gives British shipowners, we respectfully offer to American shipowners. It also is interesting to note that none of the Anglo-Saxon Petroleum Co.'s motorships have been sunk by German submarines, although they operate in the war zone, illustrating the great value of the absence of smoke, the wake of a steamer betraying her position in a manner which has not fully been appreciated.—Editor).

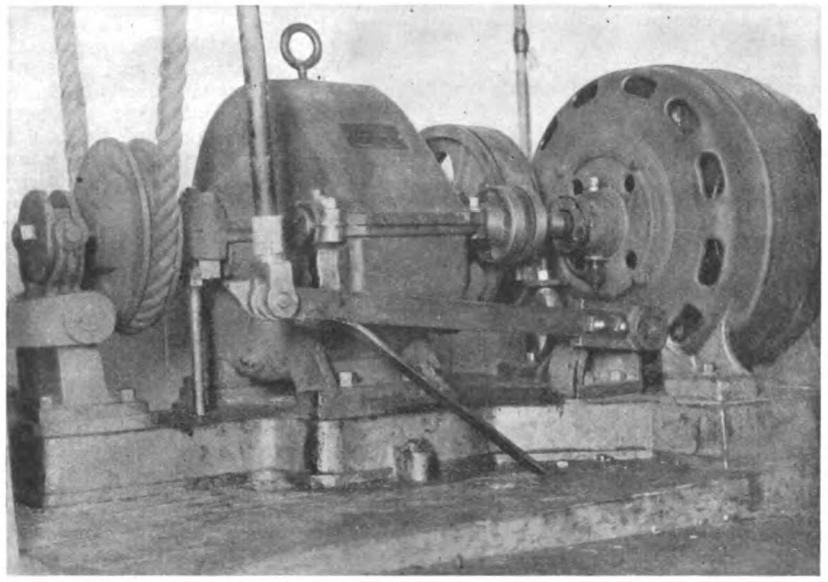
"Sinu," American-Designed Work Boat for South America



THE above plans show a 95-ft. shoal draft, working boat now being built by the Cartagena Shipyard, from designs by J. Murray Watts, of Philadelphia, for F. A. Scharberg, of Cartagena, Colombia, S. A. The dimensions are, 95 ft. over all, 90 ft. water line, 20 ft. beam and 4 ft. 6 in. draft. The motive power is to consist of a 100 h. p. Bolinders reversible marine oil engine. The boat will be used for transporting cargo and passengers up and down the river Cartagena, Colombia. There is a good-sized saloon for passengers in the deck house and plenty of room for cargo in the forward and after holds. On the upper deck are quarters for the captain and engineer, as well as the pilot house, and a covered promenade deck for passengers. There is to be a powerful electric plant installed, which not only will operate the incandescent lights and searchlights, but also the electric windlass for handling the cargo. Another very similar boat to this, but with somewhat greater draft is now being gotten out for Dr. A. C. Campbell, of Kingston, Jamaica. These boats show clearly the strides that the oil-engined motorship is making in South America and the West Indies.

Electric Steering Gear for Motorships

There is no shipping concern on the Pacific Coast which is more ready to adopt modern ship equipment than the Chas. R. McCormick Company of San Francisco. This company was the first to install heavy internal combustion oil engines in wooden ships used in lumber carrying and the success of their new motorship fleet has had a great stimulating effect on the building of modern wooden vessels in this country. In another department the company has proven itself a pioneer. The motorship "S. I. Allard," the latest of the McCormick fleet to be made ready for sea, has installed a new type of electric steering gear designed by the Herzog Electric & Engineering Company, 150 Stewart St., San Francisco. This type of electric gear is an innovation for merchant ships of moderate size, though in vessels of the navy and large ocean liners electric gear has been employed successfully for some time. The difficulty heretofore with using electric winches and other deck equipment on smaller vessels has been due chiefly to salt water getting into the mechanism. The Herzog electric gear is so insulated and protected from the elements that no inconvenience whatever has been reported. The first sea trip of the "S. I. Allard" fully demonstrated the practicability of the mechanism and so well satisfied is the McCormick Company that they will equip their entire fleet of cargo carriers, old and new vessels, with electric steering gear. The steamer "E. H. Meyer" is now having the gear installed and as soon as the equipment is ready the other vessels will be similarly equipped. Mr. Anderson, the engineer of the Herzog Company, designs the gear to meet the special requirements of individual vessels. The economy of the new equipment is evident when it is mentioned that only from 1½ to 2 h. p. is required in operation, and that this power can be diverted from the ship's electric light plant without impairing its efficiency. Moreover the apparatus is small, compact and almost noiseless, while the control is simple and positive.



NEW ELECTRIC STEERING GEAR, DESIGNED BY HERZOG ELECTRIC & ENGINEERING COMPANY

TERMINAL COMPANY PREPARING FOR ACTION.

The newly organized Terminal Shipbuilding Company, whose yards are located near Vallejo, Cal., is preparing to begin actual shipbuilding operations very shortly. Contracts are about to be signed for several small vessels and there is a possibility of work commencing on a new type of large wooden vessel designed by R. T. Stone, president of the concern. The company has opened offices at 417 Market St., San Francisco. In the large wooden ship which Mr. Stone has designed are embodied several features which it is claimed will render wooden vessels exceptionally strong and efficient. The most prominent feature is the solid keelson built up to form a center-line bulkhead the entire length of the vessel. This keelson is laid up of pieces 10 by 20 inches, in 96-foot lengths with 10-foot scarfs. The main keelson consists of five pieces of 18 by 48 inches. The length of the vessel is 355 feet over all, 58 feet beam and moulded depth of 19 feet and six inches. It is planned that the vessel be powered by a twin set of 1,000 h. p. Diesel-type engines.

R. T. Stone is a practical engineer of thirty-two years experience. A considerable part of his time has been devoted to marine construction work on the Pacific Coast. More recently Mr. Stone has been engaged in general engineering work on the Pacific Coast. The ship-building enterprise being launched was promoted by Mr. Stone after a thorough investigation of the shipbuilding field and he hopes to do his share in developing the wooden ship industry in California.

JAPANESE SHIPBUILDING HALTED.

According to the Japan Advertiser, Japanese shipbuilders have been forced to reduce their construction programs, because of the war situation in the United States and the possibility of the steel plants of the United States turning over their entire output to the Government.

COLUMBIAN BRONZE CORPORATION.

The Columbia Brass Foundry, Inc., announce the merging of their interests with those of the Columbian Bronze Corporation on May 26.

The new company will assume the name of the Corporation—the Columbian Bronze Corporation—and will assume all obligations of the Columbia Brass Foundry, Inc. This company was capitalized at $450,000 and will operate from Freeport, Long Island, New York, under the direction of the following officers:

Louis J. Hall, president; William G. Miller, vice president; Valentine G. Walters, treasurer; Robert A. Patrick, secretary. The directors of the corporation are: William G. Miller, president Wm. G. Miller, Inc.; Elbert B. Rose, capitalist; Wm. C. Biddle, president, Biddle Purchasing Company; Robert A. Patrick, Leon H. H. Rose.

A LARGE SHIPBUILDING PLANT.

It is announced from Philadelphia that the Chester Shipbuilding Company has been sold for $1,300,000. The belief is general that New York interests, representing one of the greatest financial combinations in the country, have acquired the company, and that this is to be one unit, and probably the largest, in a number of shipbuilding plants, forming the most extensive combination of the kind in the United States. Capitalists close to the Harriman interests in New York, it is understood, are in charge of the situation, the estate of the late Edward H. Harriman, president of the Union Pacific Railroad, being the nucleus of the organization.

MARINE DIESEL ENGINES IN GERMANY.

The Imperator Motor Works of Germany are now in full swing manufacturing marine Diesel-type engines. This company was formed in February, 1915. The A. E. G.'s motorship yards at Hamburg is only surpassed in capital by three other German shipbuilding companies, illustrating in a striking manner Germany's confidence in the immediate future of the motorship.

NAVAL TRAINING CAMP AT SEATTLE ESTABLISHED.

Commander Miller Freeman, publisher of Motorship, who in 1910 organized the Naval Militia of the State of Washington and who has since raised that body to its present high state of efficiency, has been signally honored by the Navy Department in being authorized to establish a naval training camp at the University of Washington. Captain Freeman, upon the entrance of the United States in the war was sworn into active service.

Twenty acres of the University campus have been chosen, upon which eleven wooden buildings and three hundred tents will be placed. The selection of the site and the plans have been made with great care with the end in view of making this unit a model of efficiency in every way, having the most approved facilities for accommodations and instruction for men preparing for officers of the Navy. Construction is now well advanced and the camp will be completed about the first of August.

A. O. ANDERSON & CO. ADDS ONE MORE SHIP

The McEachern Shipbuilding Company have launched from their Columbia River yards the fifth vessel for A. O. Anderson & Co. Another keel will immediately be laid down on the ways vacated. Another vessel is nearing completion and will be launched July 15.

MOTORSHIP "MARIE" CHARTERED.

The motor schooner "Marie," owned by Swayne & Hoyt of San Francisco, is under charter to R. D. Pinneo of Seattle, to carry a full cargo of wheat to San Francisco from Vancouver, B. C. She is equipped with a 200 h. p. Mietz & Weiss oil engine.

"GEORGE WASHINGTON" CHARTERED.

The large 10,000-ton motorship "George Washington" has been chartered to H. F. Ostrander & Co. to carry a full cargo of box shooks and general Oriental freight from Seattle and Tacoma, Wash., for Manila and Hongkong. Supplies for the Quartermaster's Department at Manila will be aboard her, as will also be a 100-foot steel stern-wheeler, loaded at Victoria, B. C., for river traffic in India.

Since the launching of this wonderful full-Diesel-powered ship, practically no engine trouble has been encountered. She is capable of carrying enough fuel for a voyage twice around the world.

WORLD'S LARGEST DRY DOCK AT LEVIS, QUEBEC.

The new graving dock at Point Levis, Quebec, is to be finished shortly. It will be the largest dry dock in the world, being 1,150 feet long, 120 feet wide and 45 feet deep, making it 10 feet deeper than the next largest at Boston, Mass., and 130 feet longer than the Gladstone dock at Liverpool, which, however, is 1 foot deeper.

ISLAND TRADER NAMED.

The new South Sea trading schooner being built for Atkins, Kroll & Co., San Francisco, by Frank Stone of Oakland, has been given the name, "Palawan" after an island in the South Seas. This vessel will be 175 feet in length, 38 feet six inches beam, and 12 feet six inches in depth. She will install two 110 h. p. Union gas engines adapted for kerosene.

ACME COMPANY PLANT.

The Acme Gas Engine Co., recently incorporated, has secured a manufacturing plant at First and Minna streets, San Francisco, and it is expected that the first engines will be turned out within three months. The factory building is of two stories and the floor dimensions are 60 by 80 feet. Machine tools are being installed and no time will be lost in building gas engines of the most modern, improved type after designs by Richard Froboese, the chief engineer of the concern. The president of the company is James S. Hawkins, formerly manager of the Standard Gas Engine Co., of Oakland, and C. C. Kriemler, also formerly with the Standard company, is vice-president and general manager. For the present only gas engines of the smaller types will be manufactured, but later on heavy oil engines of the Diesel type will be built also.

OAKLAND ENGINE MAN HONORED.

O. H. Fisher, manager of the Union Gas Engine Company of Oakland, Cal., has been signally honored by being elected president of the National Gas Engine Association at the tenth annual convention which was held in Chicago the second week of June.

Large Motorships Recently in New York Harbor

By Julius Kuttner.

THERE is something uncanny about the "Chile" as she noses her way up the harbor; for a moment or two we are puzzled, until the absence of the smoke stack dawns upon us. No doubt the first large motorship without a stack must have been the same sort of hawk in the hen-yard of accepted notions as was Robert Fulton's sailless monster.

When the Clermont first began to make headway under her own power, people told each other in all seriousness that the smoke of her stack came from a witch's caldron in the hold of the ship and that the caldron was a necessity for the witches and sprites who were turning the paddle-wheels. Such a simple and thoroughly obvious explanation well satisfied the minds of the time that had not yet mustered up enough ambition for the unpleasant task of acquiring new ideas. And until recently the modern motorship had the witches and caldron on board too; misinformation, the proper environment for prejudice and conservatism, surrounded the motorship as a smoke and a fog, in comparison to which the pine wood smoke from the Clermont was a transparent aroma.

But our attention is soon occupied by other things as we enter the engine room of the "Chile". Standing on the uppermost grating, we see what is to all intents and purposes a six-cylinder valve-in-head automobile engine of somewhat unusual dimensions. Push-rods coming up from below operate exhaust and inlet valves by means of rocker arms in a very matter-of-fact way and our first impression that we had before us some complicated arrangements fades away as we note that the other two push-rods on each cylinder also have a perfectly good excuse for existence: they operate the fuel and air starting valves. Literally speaking, "That's all there's to it", at least so far as the upper platform is concerned.

One flight lower down we note that the lower ends of the push-rods with their cam-rollers are the ends of which have bearings on the elongated crank-pin of a stationary crankshaft. "Reverse gear" says the Sherlock Holmes of the party, and his remark is borne out by the fact that we also find a double set of cams on the camshaft. Rotating the crankshaft carrying the guide-links half a turn in a direction away from the push-rods clears the cams of their rollers; the camshaft is now shifted endwise and the reverse cams are positioned for action. As the rotation of the guide-link crankshaft is continued, the rollers are brought back into their operating position.

Further down an open crank-case door gives us a glimpse of the engine crank, connecting rod, and guides, and if this had been the first thing we saw, there would have been little about it to have made us suspect that we had before us anything else than a somewhat originally designed, unusually rugged marine steam engine.

The most important auxiliary is the three-stage air compressor, which is built integral with the engine and driven from a crank on the main crankshaft. Other auxiliaries, separately driven by oil engines of the same type as the main engine or by electric motors supply oil, water, electric current, compressed air and the like exactly as do steam-driven auxiliaries on any steamship. The largest and most troublesome of the steam auxiliaries, the surface condenser, is absent; although circulating pumps are there, they are much smaller because they supply cooling water only for the cylinder jackets and pistons.

As we were leaving the "Chile," there was reported to us the story of a transatlantic voyage of a motorship also having Burmeister and Wain engines; at the end of the trip all exhaust and admission valves were "pulled", swabbed down with kerosene, and put back into the engine. After taking up an inconsiderable amount of slack in the bearings, her crew took her back across the ocean.

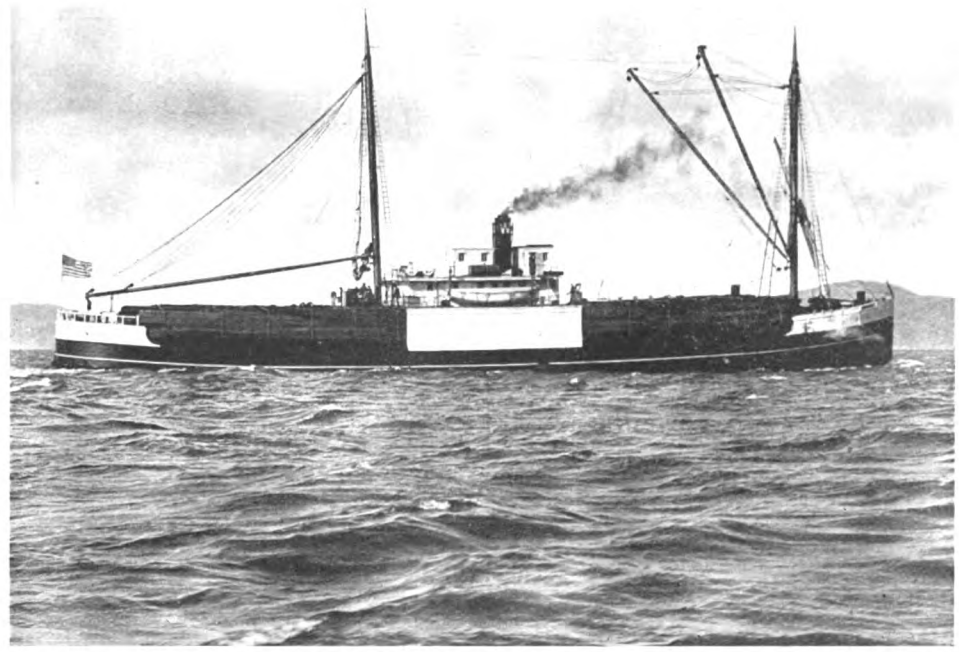
There are some significant details about the Werkspoor engines on board the "Sebastian", which was also recently visited. The Dutch engines had been substituted last year for some engines of a different make and smaller power, with the result that the present installation looks crowded. Nevertheless the engines were immediately seen to be unusually accessible, in fact there are no other Diesel-type engines built that excel them in this respect. It need only be considered that the entire connection between the bedplate and the cylinder framing consists of two forged and turned steel columns for each cylinder (with an extra pair for each block of three cylinders), a simple crosshead guide casting running from top to bottom, and a few sets of diagonal tie rods.

Some of our party had remained up on the grating next to the cylinder heads and valve gear while one or two others had gone to the grating below. Shortly afterwards someone said, "Say, they're working at some pistons down here, don't you want to come down and see them?" Those who had remained above looked at each other, because apparently not a single one of the twelve cylinder heads and sets of valve gear had been loosened or disturbed in any way. Everything was intact. It wasn't long before the available space around No. 5 cylinder of the starboard engine was crowded with eager Missourians.

Below each cylinder a refuse pan of cast iron, which is very important for protecting the crosshead and cranks from carbon and through which the piston-rod passes by way of a simple stuffing-box, is suspended by means of four steel rods. On to this the extension or skirt that had been unbolted from the cylinder liner had been lowered; the crank had been turned on the lower dead center and had thereby brought the piston to that part of its travel which normally lies in the cylinder extension. That's all there was to exposing the piston. Had it been required to get the piston out altogether, it would simply have been necessary to disconnect the piston cooling tubes, to unbolt the piston from the flanged end of the rod, and to slide it forward on a removable track provided for the purpose. As it was, the piston had not been loosened, for it was as good as it was the day it had been put in. Some workmen were cleaning the piston rings and grooves: a very important detail that cannot be attended to with sufficient frequency on most engines because of the prohibitive expenditure of time and money involved in dismantling and reassembling.

An object that caught our attention as we were leaving was a spare cylinder head and liner, cast in one piece. Since the combination is inserted in the engine framing up to the point where the separate cylinder head of the usual design would be jointed to the separate liner, and since the engine framing also forms the outer wall of what would normally be the water jacket, only the upper end of the combination casting has a water jacket. The easiest way to visualize this is to think of an ordinary dish-pan such as is used for washing dishes; turn it upside down, connect it with four short tubes (two big ones for exhaust and inlet valve cages and two little ones for starting air and fuel) to the slightly domed end of the cylindrical liner. The outer rim of the bell-mouth or dish-pan is faced so that it is capable of making a water-tight joint with a corresponding facing on the engine frame when inserted therein. When in place, cooling water from the frame naturally fills the entire bell and is at no point separated from the combustion space inside the liner by any abnormal thicknesses of metal, as is the case with cylinders having altogether separate liners with heavy flanges.

Moreover, it was noted that the tube for the fuel valve cage was placed off center, thereby allowing ample space between itself and the nearest exhaust and inlet tubes and eliminating the danger of the space being bridged across with scale. This courageous departure has justified itself in the most gratifying manner, the more so as it was made in the face of all kinds of alarms from the wiseacres. It was very significant that the members of the party were able to reach every part of the inner surface of the bell with their hands and to see almost all of it without the aid of candles and mirrors on wires. The striking proof which this gave that the water circulation is absolutely unrestricted and therefore free from the danger of being choked up by scale, and the assurance not only of the soundness of practically all the castings made but also of the certainty of eliminating the defective ones, brought out the most favorable comment from all those present.



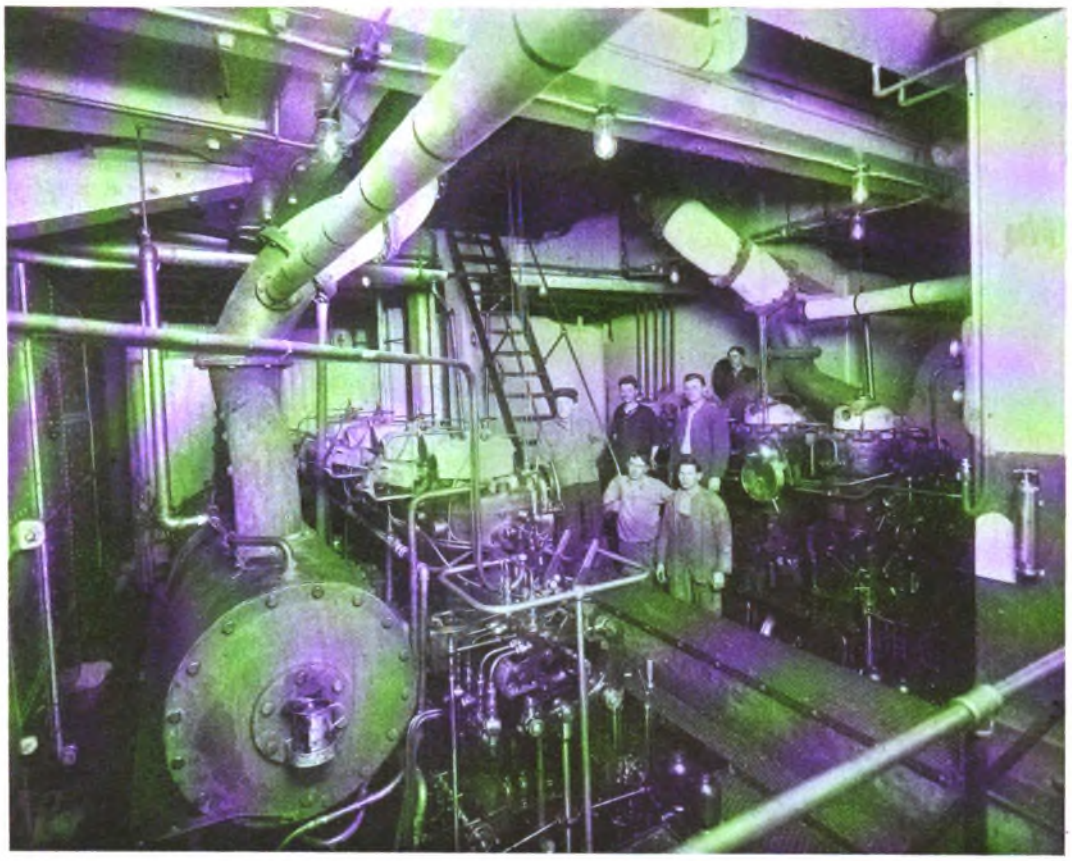
MOTORSHIP "SIERRA"

MOTOR SCHOONER "SIERRA."

The "Sierra" is what is termed on the Pacific Coast as a double ended motor schooner. The navigating bridge and engine space is amidships, separating a fore and an after hold. She was built by G. F. Mathews of Hoquiam, Wash. She is equipped with a twin set of 320 h. p. Bolinders (surface-ignition), and has a capacity of 1,200,000 feet of lumber. Her dimensions are 210 feet over all, 45 feet beam, with a draft of 15 feet. She has been chartered by the W. R. Grace Co., for June and July to carry lumber from Puget Sound to South America. This motorship is making a fine record as a cargo carrier and is one of the most efficient demonstrations of the Bolinder oil engine.

SOME RELIABILITY.

In 1903 the Nobel Naphtha Productions Co. installed three four-cycle-type Diesel crude-oil engines, each of 120 b. h. p. in the 800-ton tank-barge "Wandal." After nearly eleven years in service propelling this old vessel they were removed in 1914—not because they were unsatisfactory, but because the hull was old and worn out. In fact, the Diesel-motors were set driving dynamos on land and still are giving good service.



ENGINE ROOM OF THE MOTORSHIP "SIERRA"

THE PACIFIC SHIPBUILDING CORPORATION OF SEATTLE.

With the purchase of an eight-acre tract on the Duwamish Waterway in Seattle, and the closing of contracts for machinery and equipment for a large wooden-hull shipbuilding plant, the plans and organization of the Pacific Shipbuilding Corporation were completed. The officers state that within sixty days keels for $3,000,000 worth of ships will be laid.

David Hollywood, who has had wide experience in shipbuilding, and who has served as superintendent in the employ of the Seattle Construction & Dry Dock Company, the Heffernan Dry Dock Company and later as general manager of the Ames Shipbuilding & Dry Dock Company, has been chosen president, and is the active head of the corporation.

Hans Pederson, Seattle contractor, is vice president; C. E. Stuart, Seattle capitalist, treasurer, and George Olson, Seattle attorney, secretary and general counsel.

The board of directors of the company includes, along with the officers of the company, Fred J. Eitel of Seattle; Clarence H. Jones, who served for years as an engineer in the employ of the Kilbourne & Clark Manufacturing Company; M. C. Stuart of Seattle; Dr. E. C. Kilbourne, a former officer of the Kilbourne & Clark Manufacturing Company and one of the organizers of the Seattle Electric Company. The offices of the company are at 300 Central Building, Seattle.

Edson B. Schock, who has been retained to lay out the plant, superintended the construction of six submarines for the United States Navy by the Holland Torpedo Boat Company, and was also foreman of construction on the United States cruiser Chattanooga at the Crescent shipyards in Elizabeth, New Jersey. He served as consulting naval architect and marine engineer for the Canadian Government in Vancouver, B. C., having charge of the building of all Canadian vessels in Northwestern waters. At the present time he is laying out several large yards on the Columbia River and has been engaged by other projected plants on Puget Sound.

Hans Pederson and Fred Eitel, pioneer building contractors of Seattle, who are officers and directors of the company, will superintend the construction of the plant's buildings. Clarence Jones, an electrical engineer, will superintend the installation of the machinery.

It is planned at this time to build six ways at once, but the holdings of the corporation will easily permit of expansion. Five hundred men will be employed.

All the equipment for the yard has already been assembled, avoiding delay through slow delivery of machinery. Contracts for compressors, motors and air drills have been made, and preparations for the construction of the mold loft, office buildings, store rooms, blacksmith shops, compressor room and other buildings have been made also.

It is the intention of the company to make the yard one of the most modern and best equipped yards for the building of wooden hulls on the Pacific Coast. The plans of the yard are so laid that the highest degree of efficiency can be maintained.

The first vessel will be completed in from six to eight months and every month thereafter one will be finished, according to the plans of the company.

DOLLAR CO. BUYS "MAY."

The motorship "May," soon to be launched from the ways of the McEachern Shipbuilding Company at Astoria, has been purchased by the Robert Dollar Company of San Francisco for the sum of $300,000. The vessel will have a capacity for carrying 1,750,000 feet of lumber. The vessel was originally built for A. O. Anderson & Co.

BENICIA SHIPBUILDING CO.

A new corporation known as the Benicia Shipbuilding Co. has purchased the Robertson Shipyards at Benicia, Cal. The directors of the reorganized company are: H. R. White, Roland C. Foerster, R. L. McWilliams, Howard Finn and Herman H. Phleger.

OLD WHALER REJUVENATED.

The "John and Winthrop," an old whaling vessel which has lain in Oakland Creek for years, has recently been examined by Tom Crowley, of the Crowley Launch & Towboat Company, who bought her for a few hundred dollars, had her dry-docked at Hanlon's and found her oak hull firm and seaworthy, though the decks and superstructure will have to be rebuilt. The vessel is now at the Crowley yard in Oakland undergoing the alterations. She will probably be used in the off-shore trade as a sailer for the present, but it is planned to install auxiliary power at some future time if her condition warrants it. The craft was formerly a bark, but her new rig will be that of a three-masted, bald-headed schooner. She measures 114 feet over all, is 28 feet in the beam and has a depth of 28 feet. She has a capacity of 321 tons, net, was built in Bath, Me., in 1876, and was formerly owned by H. J. Knowles of San Francisco.

FOREIGN TRADE ON PACIFIC TO BE PROMOTED.

Representatives of the Chambers of Commerce and other commercial organizations of the Pacific Coast, who are interested in the fight to restore the merchant marine of the Pacific Coast will meet in Seattle July 2, to further a campaign before Congress. The meeting has been cal ed by J. C. Rohlfe, manager of the marine department of the Standard Oil Company, who has been appointed chairman of this committee by the Associated Chambers of Commerce of the Pac fic Coast. Mr. Rohlfe's headquarters are in San Francisco.

The organization of Pacific Coast commercial bodies to promote foreign trade relations and to encourage expansion of Pacific Coast shipping was formed last month at a meeting held in San Francisco. The movement was initiated by the Seattle Chamber of Commerce and Commercial Club, but the first meeting was held in San Francisco to interest the southern shipping men.

It is the purpose of the organization to carry on a regular propaganda in favor of the upbuilding of the merchant marine. The first effort will be to keep open all trade lanes during the war and to see to it that the foreign commerce of the United States from the Pacific Coast is developed as much as possible.

When the war is over it is hoped by the Pacific Coast interests that the trade movement will have gained such momentum that ships released by the war can immediately be placed in service to take care of developed commerce.

Initial steps in this campaign have been taken on the Pacific Coast, but before waging a fight before Congress it is planned to interest shipping people, and those engaged in foreign trade along the Great Lakes and the Atlantic and Gulf Coasts.

Standing alone, the Pacific Coast interests do not think they are strong enough to put a constructive program through Congress, but if all sections are united, it is believed that a comprehensive plan for enlarging the United States foreign trade after the war can be adopted. It generally is agreed that America's foreign trade is to be protected and fostered as much as possible during the period of the war.

The San Francisco meeting was the first conference representatives of Pacific Coast commercial bodies have held on the shipping problem and only preliminary organization was effected at that time. It is expected at the Seattle meeting the active campaign can be authorized.

COAL TRANSPORTATION BY MOTORSHIP.

There is a touch of subtle humor in the carrying by the auxiliary oil-engined motorship "City of Portland" of 2,000 tons of bunker coal from Australia to Honolulu. Recently the British Government imposed a coal-shipment embargo, but this later was modified so far as the Hawaiian Islands are concerned and the first shipment under the new rule was made by a vessel driven by crude-oil motors. Seriously, though, there are excellent prospects for Diesel-engine propulsion in the collier business, and we suggest that it would pay coal merchants to make some careful investigations. Take as an example the "City of Portland." In her holds she carried 2,000 tons of coal, whilst in her bunkers she needed only about 100 tons of oil fuel. If she had been a full-powered steamer of similar capacity and the same average and speed she would have used about 900 tons of coal under her boilers. In other words she would have arrived at Honolulu with but 1,200 tons of coal cargo, whereas the auxiliary "City of Portland" arrived with the 2,000 tons of coal intact.

OPERATIONS IN NEWFOUNDLAND.

Christoffer Hannevig, of Norway and New York, is head of the Newfoundland Shipbuilding Company, which is understood to have decided upon Harbor Grace, Conception Bay, for a site. It is estimated that $9,000,000 will be spent in equipping the plant, which will at first turn out wooden ships and later steel vessels. The company is starting out with 250 men and later will increase this number to 500.

ADDED CAPITAL FOR EAST ASIATIC CO.

In order to liberate enough capital to enable the East Asiatic Co. to pay for the 20 large motorships that they now have on order, they have transferred several rubber plantations and a factory to a subsidiary company for the sum of 20,000,000 Kroners ($6,000,000). The total tonnage of these vessels now building is 230,000, but it will be four years before some of them are launched. When these are completd the East Asiatic Co. will have a fleet totaling nearly 40 large Diesel engine driven vessels.

MOTORSHIP "W. F. BURROWS."

Libby, McNeill & Libby, one of the latest converts to heavy oil engines for ship propulsion, has had recently completed for them, the motorship "W. F. Burrows."

Construction on the vessel was started in September at the Standifer-Clarkson Shipyards, North Portland, Ore., and was completed in May of this year. She was launched in April. Mrs. C. C. Colt, a prominent society woman of Portland, acted as sponsor, naming the vessel after the president of the company, W. F. Burrows.

After the launching, twin Skandia surface-ignition engines of 240 h. p. each were installed (these engines give the ship a speed of 6½ miles) and the ship proceeded to Seattle, where she will take on a cargo of cannery supplies for Bristol Bay, Alaska.

The Company reports the engines to have worked satisfactorily and quite up to expectations. On the trip to Seattle no engine trouble was encountered.

The "W. F. Burrows" is a wooden hull vessel measuring 220 feet over all. Her beam is 34 feet and she draws 16 feet of water, with a gross tonnage of 2600. She has a capacity for 1,000 barrels of fuel oil. Her crew is composed of twenty-four officers and men. Accommodations have been made for twenty passengers, the rooms being handsomely furnished. Every provision has been made to expedite the handling of cargo, the vessel being equipped with electric winches, made and installed by the Pacific Machine Shop and Mfg. Co., of Seattle.

NEW S. F. AGENT FOR STERLING ENGINES.

A. G. Hebgen, 436 Market street, who has the local agency for the Evinrude motor, has just been given the agency also for the engines manufactured by the Sterling Marine Engine Co., of Buffalo, N. Y. In the past this agency has been held by the C. Willard Evans Co., 187 Fremont street.

ADDITIONAL MOTORSHIPS TO BE ORDERED.

We have been advised by the Anglo Saxon Petroleum Co., managers and agents for the Nederlandsch-Omdoscje Tank Stoomboot Maatschappij, who own nearly a dozen Diesel-driven motorships, and several surface-ignition oil-engine driven ships, that it certainly is their intention to order further motorships in future; but that they are not doing so at present, owing to the difficulty in coming to an understanding with shipbuilding yards in connection with obtaining early delivery of vessels at reasonable prices.

All shipowners who do not believe in the reliability and possibilities of the motorship will do well to bear this in mind because "the proof of the pudding is in the eating thereof," and the foregoing companies have been able to ascertain by reason of personal experience that the motorships are superior in all directions to steam-driven craft.

CONVERSION OF STEAMERS TO MOTOR POWER.

The number of ships that are being converted from steam machinery to internal-combustion-engines is increasing rapidly, and the latest is the conversion now being made by the Anglo-Saxon Petroleum Company of four steamships to Diesel propelling power. Other vessels that have been converted from steam to motor are the "Zafiro," 1,062 tons gross, 400 b. h. p., owned at Vancouver, B. C.; "Mikahala," 320 b. h. p., owned by the Inter-Island Steam Navigation Co.; "Robert Nobel," 1,700 tons d. w. c. 1,000 i. h. p., owned by the Nobel Naphtha Production Co.; "Bandon," 6,000 tons d. w. c., 1,700 i. h. p., owned by the East Asiatic Co.; "Chumpon," 6,000 tons d. w. c., 1,700 i. h. p., owned by the East Asiatic Co.; "Pangon," 6,000 tons d. w. c., 1,700 i. h. p., owned by the East Asiatic Co., "Jakut," a tug, 340 b. h. p., owned by the Nobel Naphtha Production Co., "Parkdale," 1,480 tons d. w. c., 600 b. h. p., owned at Rio de Janiero, and the "Hebe" and "Gestirikland."

ENGINE SALES ON SAN FRANCISCO BAY.

The San Francisco Bay district is itself felt on eastern as well as foreign markets so far as Diesel type marine engines are concerned. The Union Gas Engine Company is being flooded with orders for kerosene burners, and the Skandia Pacific Oil Engine Company has the completion of its first five contracts and the receipt of forty more orders. Although the Skandia orders come mainly from coast yards there are several from distant ports such as Manila, St. Johns, Newfoundland, and Norway. The first five orders, all now delivered, were each for twin 240-horsepower engines with auxiliaries.

REVIEW.

"Practical Marine Engineering" (Fourth Edition), by Capt. C. W. Dyson, U. S. N. Published by the Aldrich Publishing Co., 461 Eighth Avenue, New York City. Obtainable from Motorship, L. C. Smith Building, Seattle, Wash. Net Price $6.00.

One of the finest handbooks on general marine engineering has just had its fourth edition published. We refer to "Practical Marine Engineering," by Capt. C. W. Dyson, of the Bureau of Steam Engineering at Washington, D. C., a copy of which every marine engineer should carry on the shelf of his cabin and study at his leisure moments. Shipowners, too, would do well to keep a copy in their offices for reference purposes, and having such a valuable work handy in many instances would save a mistake that otherwise would cost thousands of dollars. It also is intended for students who are preparing for examinations for marine engineers' licenses, altogether there being 1000 pages and 550 illustrations in the book.

Capt. Dyson in revising the work has considerably enlarged it and the following are some of the subjects handled:

Materials.—Fuels (coal and oil), boilers (fire tube and water tube), oil fuel burning, marine engines, reciprocating engines, steam turbines, internal combustion engines—gasoline, heavy oil (Diesel), producer gas.

Auxiliaries:—Pumps, condensers, feed heaters, filters, evaporators, lubricating devices, separators, blowers, pneumercators, time firing regulators, steam traps, ash ejectors, etc, valves and valve gears, refrigeration, electricity, propulsion and powering, operation, management and repairs, boilers, engines, turbines and auxiliaries, indicators and torsion meters, special topics and problems, computations for engineers.

The section on oil-firing of marine boilers is very complete, and includes descriptions of the leading type of burners.

Then again there is a chapter nearly 100 pages long, dealing very completely with internal combustion engines, including those of gasoline, Diesel-type, heavy oil and producer-gas classes, although curiously enough the surface-ignition type of oil engine is not even referred to. While the oil-engine section is very interesting, it by no means is the most important, the chapter on operation, management and repair of steam machinery being very complete and thorough. The chapter on computations will be found most valuable for motor and steam engineers alike.

OIL ENGINE NOMENCLATURE.

In Great Britain the Bolinders marine oil engine is advertised in the shipping papers as—"the engine that is neither a Diesel nor semi-Diesel." What more is needed to support the term "surface-ignition oil engine"?

THE U. S. M. T. "MAUMEE."

According to International Marine Engineering the U. S. naval motor-tanker "Maumee," which is the largest and highest-powered Diesel-driven vessel in the world, has run 18,000 miles in five months, without a hitch, and that the only defect has been the cracking of some of the cylinder jackets due to lack of sufficient clearance between the liners and jackets. This certainly is pleasing and welcome news, especially as the design of the engines of the "Maumee" are by no means the acme of marine Diesel-engine construction, and if oil engines can operate successfully under such conditions the future of large motorships is assured. Some special and unusual information regarding this vessel was published in the February Motorship.

MOTORSHIP

A journal devoted exclusively to Commercial Motor Vessels and their operation. Issued on the 25th of each month.

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GERMANY AND OIL TANKSHIP SINKINGS.

Urgent Need for a Fleet of Diesel-Driven Vessels.

We desire to draw Washington's attention to the special endeavors that Germany is making to sink tankships now engaged in the trans-Atlantic trade, and the seriousness of the situation should she succeed in sinking many more, for tankers must be steel vessels (unless case oil is carried) and steel vessels cannot quickly be built today in addition to vessels now laid down.

The position is most serious because the Allies are dependent upon this and other overseas countries for the greater supply for their armies and navies and coastal-defence services. Sir Albert Stanley recently admitted that owing to unforeseen sinking of tankers the fuel situation in Great Britain will be worse. Since then several more tank-vessels have been sunk.

Gasoline and oil-fuel has to be shipped to Europe for the Allied fleets, the hundreds of aeroplanes, thousands of tractors, "tanks," automobiles, thousands of motor-yachts and launches, and for the 550 eighty ft. patrol boats now in service in Allied waters and in France. The 550 American-built patrol-boats alone require about 60,000 tons of gasoline per month, and, when the 340 one-hundred-and-ten-foot submarine chasers now building are sent over, the demand will be greatly increased, for each of these boats will require over 80 gallons of gasoline per hour when at full speed, apart from lubricating oil. That is to say a maximum total of 688 tons an hour for the fleet of 340 boats when at full speed. What will be the requirements when the thousands of aeroplanes and tractors are sent to France by the United States?

According to Sir Albert Stanley the British Government sent to France for the use of her army alone 47,000,000 gallons of gasoline up to Oct. 30th of last year. Since then her requirements must have trebled apart from the enormous supply needed in Great Britain.

The Anglo-Saxon Petroleum Company own a large fleet of Diesel-driven tankships, yet not a single one has been sunk by submarines, which is sufficient reason to warrant the Shipping Board immediately ordering a number of Diesel-driven tankers—for tankships must be quickly built or a serious situation will arise. Germany knows that the Allies are dependent upon overseas for fuel, and that if he can stop the supply by sinking all the tankships she will throw the entire naval and military operations of the Allies entirely out of gear—a position too terrible in its results to contemplate.

There are about 50 to 60 tankers now on order in this country but this quantity is not sufficient and a small fleet of Diesel-driven tankers should be laid down at once. The Wm. Cramp & Sons Ship & Engine Building Works, the Newport News Shipbuilding & Dry Dock Co., the New York Shipbuilding Corporation—three of America's largest shipbuilders, all are in a position to instantly commence construction of Diesel-driven tankships should the Government desire, provided, of course, some of the lesser important naval construction work can be temporarily held up. In giving this warning we fully believe we are only doing our duty.

PROPOSED DIESEL TRAINING SHIP FOR YOUNG AMERICAN ENGINEERS.

As yet no ship owner, or ship owning company, has come forward in response to the suggestion made by Motorship in its January issue that ship owners contribute funds for the purpose of building a Diesel-driven wooden auxiliary sailing ship for the purpose of training young Americans as sea-going Diesel engineers. We shall be glad to hear from several owners who are willing to "set the ball rolling."

It is the start that always is the difficulty in such cases, so if two or three owners will come forward and express their willingness to immediately contribute ten or twenty thousand dollars apiece Motorship will follow up with an active campaign to secure the balance of the money, and to assist in every possible way with the scheme.

As such a vessel will be a commercial proposition, and not a charitable affair, there seems to be no reason why a syndicate of ship owners should not form a small private company for the purpose; because such a vessel would carry cargo and would act as a tramp calling at ports all over the world, hence should prove profitable, in addition to doing her work of training young lads to be marine Diesel engineers. Furthermore, the parents of many boys would be willing to pay moderate premiums in order to obtain for them splendid experience and training.

For the engine-room auxiliaries, surface-ignition (hot-bulb) oil engines could be used. For propelling purposes twin-screws would be adopted, one two-cycle Diesel-type engine and one four-cycle Diesel-type engine being fitted. Thus proper knowledge of the leading examples of marine crude oil engines would be obtained under sea-going conditions.

This will be a splendid method of overcoming the motorship engineer question, and we await with interest the co-operation of ship owners. Let no time be lost!

A FEW WORDS OF CAUTION.

In the haste to obtain "ships at any price" many shipowners are showing a tendency to order heavy-oil driven wooden motorships and auxiliary vessels without exercising the same proper amount of discrimination as would be used in more normal times, consequently the reliability of the Diesel and surface-ignition type of crude-oil using engines again is being jeopardized, and if more caution is not more widely used there may be a repetition of the troubles that were experienced in Europe three to four years ago, which "blackeyed" the internal combustion engine. Many of the new concerns that have undertaken the construction of wooden vessels are controlled and operated by men of experience in wooden shipbuilding, while some of the others that are springing up like mushrooms are not in so fortunate a position.

Even some of these experienced builders have not the knowledge of the proper requirements of good oil-engine installation, so the results of motorships built by men who have not the full knowledge of either may well be imagined. In the past, 75 per cent of the troubles with oil-engined motorships have been with the auxiliary machinery or due to careless installation and arrangement of both the main engines and machinery, so that the work of installation and the arrangements of the installation cannot be given too much thought by owners.

Furthermore, shipowners are ordering large numbers of such motor-vessels without making any arrangements for training engineers, evidently trusting to luck to secure licensed men when the vessel is ready. Such owners deserve what they get, only, unfortunately they will be the first to damn the marine oil-engine when they find that troubles are arising through inexperienced engineers in conjunction with a poor installation. The wise shipowners are engaging a couple of certificated steam-engineers for every vessel that they have an order and sending these men to the engine-building works for a training while their ships and machinery are being constructed. Once a steam-engineer has had experience with motorships he never will go back to steam.

WHY OCCUPY VALUABLE CARGO SPACE WITH COAL OR OIL FUELS?

Three hundred and fifty (350) tons of residual oil fuel gives a 2,200 i. h. p. Diesel-engined ship of 5,413 tons gross-cargo-capacity (118,750 cases of benzine) a radius of 11,500 nautical miles at an average ocean-speed of 9½-10 knots without re-bunkering.

An oil-fired steamer would require at least 1,400 tons of oil, and a coal-burning steamer 1,600 tons, in their bunkers to cover the same distance. But this fuel-bill saving is only one item.

For the above capacity the motorship is of 7,720 tons displacement, so is cheaper in first cost than a steamer. Shipowners can easily figure out the greater displacement of the steamers; also the enormous annual saving that is gained by using the bunker space for cargo carrying. If this is valuable now, it will be more valuable if a freight-cutting war comes in the near future. Think this over! These figures are actual instances—not theories! The engineer question quickly will work out its own solution in a satisfactory manner, so don't let that prevent you from placing orders.

IS THE MOTORSHIP INDUSTRY PROGRESSING?

That our readers may properly realize the enormous extent that the motorship industry already has reached we quote the output up to the present time of one factory—namely, the Bolinders Co. of Stockholm. This company has oil-engined ships aggregating over 115,000 tons and of 500,000 b. h. p., and already there are over 12,000 oil motors of this particular make at work.

AN UNFORTUNATE SELECTION.

Last year a certain large Pacific Coast fisheries company constructed two vessels of considerable tonnage. After investigation the owners decided upon sacrificing considerable cargo space by installing steam equipment in preference to oil-engines, as the delivery on the latter was too uncertain. Today the first of these vessels is tied up in an adjacent waterway awaiting her boilers and anyone who knows the marine boiler and plate situation also knows that the possibility of obtaining inside furnaces for marine boilers is very remote.

Oil engines, on the other hand (of some makes), may have been slow in delivery during the latter part of 1916, but Bolinders, Skandias and others are obtainable today on quick delivery, each and every factory having doubled and trebled its capacity of production. Steam engines were never standardized and probably never will be; an order for a set, therefore, means plans, patterns, castings, machinery, erection, etc., etc. Today the oil-engine you want is ready for shipment and the space saved in your vessel constitutes a gift which none can afford to overlook.

THE SINKING OF TANKERS—TARGET PRACTICE FOR SUBMARINES.

While all the Diesel-driven motor tankships carrying fuel for the Allies have been able to escape sinking by submarines, either through their low visibility (i. e., absence of smoke) or to their reserve power and speed capabilities, the sinking of oil-burning, steam-driven tankers is a weekly occurrence,—and tankers are more urgently needed than any class of ship, particularly by France, who is clamoring for gasoline and kerosene in huge quantities. Among steam-driven tankers recently sunk were two carrying 1,200,000 gallons of badly needed gasoline. This happened in the first week of May. When will the government and shipowners wake up and build motorships? With submarines lying-in-wait for every wisp of smoke, it is madness to continue building steamers, when motorships can be built instead. Steamers instead of reaching port with the merchandise aboard, form excellent target-practice for the German submarines. No freight-carrying motorship has yet been sunk by either.

MR. MORTON'S ARTICLE TO BE CONTINUED IN THE AUGUST ISSUE.

The continuation of Mr. Morton's article on Full-Powered Motorships, Their Economy and Future, will be printed in next month's issue of Motorship.

Operating Costs for One Year of the Diesel-Engined Fleet o

Together with the Working Charges of 3

Name of Vessel	Type of Vessel	Cargo Tons	IHP.	SHIP DIMENSIONS Length B. P. ft.	in.	Breadth ft.	in.	Moulded Depth ft.	in.	ENGINE DIMENSIONS Draught ft.	in.	No. of Sets.	No. of Cyls.	Diameter and Stroke mm.	R.P.M.	STYLE OF REVERSING	Year of Construction
EMMANUEL NOBEL	T. S tankship	4,800	1,400	380	0	46	0	25	0	16	6	2	8	490 x 740	150	¶Reverse through gear wheels and Koreiwo clutches	19
KARL HAGELIN	T. S. tankship	4,800	1,400	380	0	46	0	25	0	16	6	2	8	490 x 740	150	¶Reverse through gear wheels and Koreiwo clutches	19
ROBERT NOBEL	T. S. tankship	1,700	1,000	260	0	34	0	17	0	14	0	2	8	450 x 510	200	Directly reversible engines driving through Dohmen-Leblanc clutches	19
ZOROASTER	T. S. tankship	2,000	1,200	270	0	33	4	20	0	15	6	2	8	450 x 680	200	Directly reversible engines	19
GALLILFI	T. S. tankship	2,000	1,200	270	0	33	4	20	0	15	6	2	8	450 x 680	200	Directly reversible engines	19
TALMUT & sister ships	T. S. tankship	Tons Cargo twd 850	500	245	0	28	0	15	0	12	6	2	4			¶Now having directly reversible engines installed. Directly reversible engines	
VELIKOROSS	Paddle tug	DWC 28 13,000	950	188	0	32	0	8	6	3	6	2	6	450 x 680	200	Directly reversible engines	19
MALOROSS	Paddle tug	26 13,000	950	188	0	32	0	8	6	8	6	2	6	450 x 680	200	Directly reversible engines	19
KIRGIS	Paddle tug	70 9,700	750	176	0	30	0	12	0	2	9	2	6	350 x 530	240	Direhtly reversible engines	19
KALMUK	Paddle tug	35 9,700	750	190	0	30	0	8	0	2	11	2	8	350 x 530	240	Directly reversible engines	19
LESGIN	Paddle tug	90 4,800	500	175	0	29	0	8	0	2	4	2	8	330 x 380	270	Directly reversible engines driving through Dohmen-Leblanc clutche	19
OESTIN	T. S. Tug	20 4,000	500	105	0	22	2	9	6	5	0	2	8	330 x 380	270	Directly reversible engines driving through Dohmen-Leblanc clutches	19
YAKUT	T. S. Tug	33 3,200	420	105	0	22	2	7	6	5	0	2	8	250 x 390	240	Directly reversible engines	19
SARMAT	T. S. tank barge	800	440	244	6	31	9	8	0	6	0	2	8	320 x 240	240	Ahead: Either direct of electrically Astern: Only by electric transmission	19
SAMOYED	Paddle tug	10 3,200	400	132	9	19	0	8	3	3	3	2	6	330 x 380	260	Directly reversible engines driving through electro-magnetic clutches	19
INGUSCH	Paddle tug	10 2,100	250	140	0	22	0	4	6	1	7	1	4	330 x 380	260	Directly reversible engines	19
BELOMOR	Paddle tug	8 1,600	200	110	6	17	0	$	0	3	3	1	3	330 x 380	290	Directly reversib e engine driving through electro-magnetic clutch	19
KAREL	Paddle tug	10 1,200	130	105	8-	18	3	5	6½	2	0	1	2	337 x 362	260	Directly reversible engine driving through e ectro-magnetic clutch	19
GILYAK	T. S. tug	3 $00	120	66	0	15	0	6	6	2	4	2	6	200 x 250	450	Directly reversible engine driving through electro-magnetic clutch	19
MASUR	Paddle tug	10 2,100	250	150	0	22	0	6	6	1	8	1	4	330 x 380	290	Directly reversible engine	191
POLYAK	Paddle tug	10 2,100	250	150	0	21	0	5	0	1	8	1	4	330 x 380	270	Directly reversi le egine	191
MADYAR	Paddle tug	10 2,100	250	150	0	22	0	5	0	1	0	1	4	330 x 380	270	Directly reversible engne	191
OSTYAK	Paddle tug	40 4,800	500	175	0	27	0	8	0	2	4	2	8	330 x 380	270	Directly reversible engine $Originally had reverse through gear wheels and Koreiwo clutches. Converted in 1911.	191
LEV	Paddle tug	Tons Cargo twd 14,500	1,100									2	4	584 x 1130 —1524	24	Directly reversible engines	Worki Yea 191
VOLGA	Paddle tug	13,800	1,000									2	6	597 x 914x 1372 x 1524	25	Directly revrsible engines	191
DJUSCHI	Paddle tug	10,500	700									2	4	762 x 1424 —1525	26	Directly reversible engines	191
MONGOL	Paddle tug	8,900	600									2	4	677 x 1270 —1422	30	Directly reversigle engines	191
ANNA	Paddle tug	3,600	350									2	4	498 x 940 —1098	28	Directly reversible engines	

Steamers *versus* Motorships

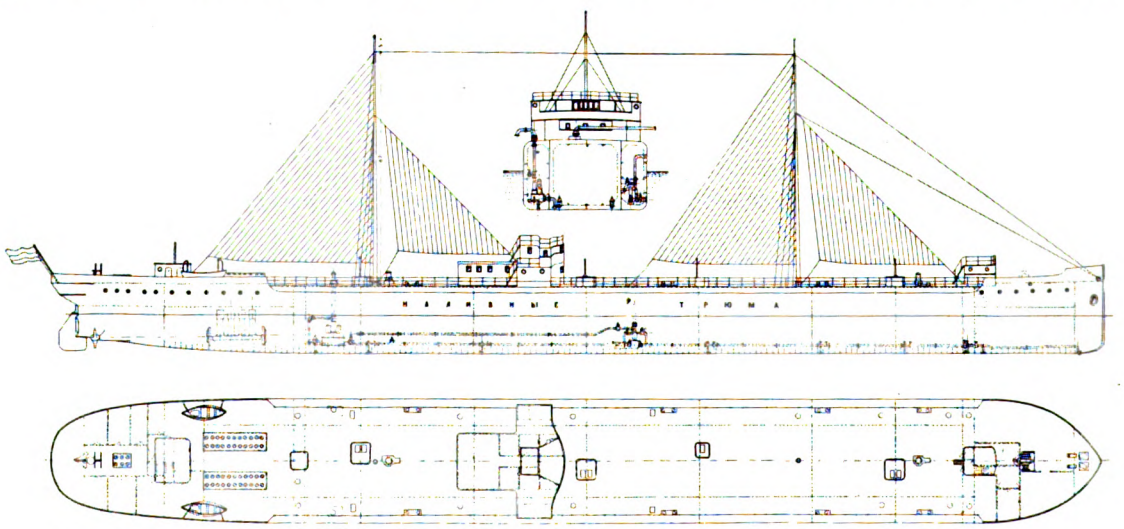
Actual Operating and Maintenance Costs of a Large Fleet

IN Russia, as we previously have indicated, there are large numbers of Diesel-driven warships, submarines, tankers, passenger vessels, mail-boats, tugs and freighters, and these various motorships run into several hundreds of bottoms. We are enabled to put before our readers the actual pre-war operating costs for one season of the principal vessels of the Nobel Bros. Naphtha Production Company's fleet of Diesel-driven and oil-fired steam-driven ships, which we hope will once and for all silence critics and all those who genuinely believe that Diesel motorships have very heavy operating and maintenance expenses, said to be due to their supposed unreliability and need of constant repair. The figures, which were furnished from the books of the Nobel Company to Mr. R. W. Crowly, foreign manager of the Wellman-Seaver-Morgan Co. of Cleveland, Ohio, to whom we are indebted, on the occasion of his visit to that country on the behalf of Internal Combustion Engineering just prior to the outbreak of war, when he made a special investigation of the operation of Diesel-driven motorships in Russia. Motorship has never denied that a few certain motorships have been unsuccessful and uneconomical; but these figures go to show that, taken as a whole, motorships undisputably demonstrate their superiority in all directions. Let it also be remembered that since these particular ships were placed in service vast improvements in Diesel design have been made.

To give an idea of the vast size of the Nobel Company's fleet, Mr. Crowly says that even at the end of 1912 they possessed over three hundred vessels of all kinds with a total dead-weight-capacity of 370,000 tons, and a total power of 23,592 h. p. Of this no less than 13,284 b. h. p. was represented by Diesel-type oil engines. In other words, considerably more than half of their ships are motorcraft—a fact which may stagger some American shipowners.

The operation of these ships is like on the Great Lakes, as between five and seven months in the year the fleet has to remain idle owing to the ice. During the remaining six months there reigns a feverish activity and the ships are worked at a pressure that spares neither men nor metal. Hence, it will be understood that during the summer no time can be spared for repair or overhauls, and so the propelling machinery must be absolutely reliable. That the Nobel Company pin their faith principally to the Diesel-type oil-engine is a wonderful testimonial to the merits and reliability of this system of propulsion, and if our own Shipping Board and domestic shipowners do not benefit by this experience it will show an obstinacy that is beyond all hope of redemption.

"There is no room in the Nobel fleet for engines that will not do their duty," says Mr. Crowly. Night and day these motorships and tugs work while the navigation on the Volga is clear towing heavy loads up the streams, leaving lighters here and there, collecting boats that have been discharged, now running light between stations, then working the boats in and out, and towing them down stream again for another load of oil-cargo. It all proceeds at a furious pace, and



RUSSIAN MOTOR TANK SHIP "K. W. HAGELIN," OWNED BY NOBEL BROS. NAPTHA PRODUCTION CO.

of the Nobel Bros. Naphtha Production Company of Russia

Some Steamers Owned by the Same Firm

...of ...truc-...ion	TYPE OF ENGINE	Season's Transport in Ton-Miles	Total Working Days in the Navigation Year			Fuel Consumpt'n: Tons	Fuel Consumpt'n: Wages	ANNUAL EXPENDITURE PER SHIP: Maintenance	Lubrication	Light and Heat	Fuel	Sundries	Total Annual Outlay	Capital Cost of Ship	REMARKS
		Baku-Astrakan Service									$9.40 per ton				
1909	Kolomna 4-cycle Diesel	155,000,000		212		820	$12,731.00	$7,639.00	$1,504.00	$485.00	$7,794.00	$1,785.00	$31,932.00	$420,010.00	
1910	Kolomna 4-cycle Diesel	155,000,000		212		793	$12,731.00	$7,639.00	$1,504.00	$485.00	$7,537.00	$1,785.00	$31,670.00	$420,010.00	
1910	L. Nobel 4-cycle Diesel	59,000,000		224		701	$10,185.00	$5,602.00	$1,096.00	$281.00	$6,674.00	$1,222.00	$25,060.00	$198,090.00	
1911	Kolomna 4-cycle Diesel	70,000,000		218		788	$10,185.00	$6,111.00	$1,402.00	$330.00	$7,488.00	$1,426.00	$26,942.00	$229,162.00	
1911	Kolomna 4-cycle Diesel	70,000,000		218		788	$10,185.00	$6,111.00	$1,402.00	$330.00	$7,794.00	$1,426.00	$27,247.00	$229,162.00	
....	Coumpound (Steam)'	28,000,000				1,769	$9,167.00	$4,331.00	$354.00	$257.00	$1'9805.00	$970.00	$31,884.00	$89,119.00	
		River Volga Service	**L'ded**	**Light**	**Man'v-ring**						$10.96 per ton				
1909	Kolomna 4-cycle Diesel	62,000,000	100	38	14	682	$5,598.00	$2,852.00	$766.00	$179.00	$5,350.00	$407.00	$ 14,953.00	$127,312.00	Paddles turn 25 rpm.
1909	Kolomna4-cycle Diesel	66,000,000	105	38	15	507	$5,398.00	$3,055.00	$815.00	$179.00	$5,626.00	$407.00	$15,481.00	$127,312.00	Paddles turn 25 rpm.
1908	Kolomna 4-cycle Diesel	55,000,000	113	37	8	442	$5,194.00	$2,546.00	$509.00	$179.00	$4,913.00	$359.00	$13,701.00	$101,850.00	Paddles turn 30 rpm.
1910	L. Nobel 4-cycle Diesel	52,000,000	98	35	14	410	$5,093.00	$2,444.00	$509.00	$179.00	$4,559.00	359.00	$13,144.00	$101,850.00	Paddles turn 26 rpm.
1910	L. Nobel 4-cycle Desel	30,000,000	98	33	6	257	$4,583.00	$2,037.00	$461.00	$155.00	$2,850.00	$281.00	$10,369.00	$81,480.00	Paddles turn 30 rpm.
1910	L. Nobel 4-cycle Diesel	24,000,000	100	32	24	289	$4,331.00	$1,911.00	$354.00	$141.00	$3,211.00	$257.00	$10,204.00	$76,387.00	
1909	Polar 2-cycle Diesel	21,000,000	98	35	12	241	$3,312.00	$1,785.00	$306.00	$126.00	$2,672.00	$242.00	$8,444.00	$76,387.00	
											$12.60 per ton				
1911	L.Nobel 4-cycle Diesel	Special Service		150		238	$4,074.00	$2,294.00	$354.00	$102.00	$3,017.00	$994.00	$10,835.00		
1909	L. Nobel 4-cycle Diesel	Special Canal Service		150		169	$3,056.00	$1,882.00	$383.00	$141.00	$2,139.00	563.00	$8,163.00	$61,110.00	Paddles turn 35 rpm.
1910	L. Nobel 4-cycle Diesel	Sp'l Canal Service				129	$2,803.00	$1,450.00	$257.00	$126.00	$1,630.00	$340.00	$6,606.00	$40,740.00	Paddles turn 35 rpm.
1908	L. Nobel 4-cycle Diesel	Sp'l Canal Service				87	$2,294.00	$1,222.00	$228.00	$126.00	$1,120.00	$306.00	$5,296.00	$40,740.00	Paddles turn 30 rpm.
1908	Bergsund 2-cycle("Semi-Diesel")	Sp'l Canal Service				88	$1,785.00	$1,120.00	$204.00	$112.00	$1,120.00	$291.00	$4,632.00	$24,444.00	Paddles turn 35 rpm.
	Loke 2-cycle ("Semi-Diesel")	Sp'l Canal Service				113	$1,528.00	$1,018.00	$179.00	$92.00	$1,426.00	$272.00	$4,515.00	$12,731.00	
	L. Nobel 4-cycle Diesel	Special Service on R. Weichsel													
	L. Nobel 4-cycle Diesel						Results not available.				Ships completed only in autumn.				
	L. Nobel 4-cycle Diesel														
											$15.70 per ton				
...g	Kolomna 4-cycle Diesel	Special Service in Siberia				257	$6,111.00	$2,294.00	$509.00	$204.00	$4,074.00	$407.00	$13,599.00	$89,119.00	Paddles turn 30 rpm.
		River Volga Service									$10.96 per ton				
	Compound (Steam)	65,000,000	100	25	12	3,055	$5,602.00	$2,546.00	$432.00	281.00	$33,868.00	$432.00	$43,160.00	$50,925.00	Paddles direct coupled
	Triple eepansion (Steam)	67,000,000	108	35	15	1,656	$5,451.00	$2,294.00	$354.00	$228.00	$18,366.00	$432.00	$27,116.00	$81,480.00	Paddles direct coupled
	Compound (Steam)	51,000,000	108	25	12	1,592	$5,194.00	$2,294.00	$354.00	$228.00	$17,644.00	$407.00	$26,122.00	$68,749.00	Paddles direct coupled
	Compound (Steam)	42,000,000	116	30	12	1,431	$4,889.00	$2,037.00	$257.00	$228.00	$15,864.00	$407.00	$33,683.00	$64,675.00	Paddles direct coupled
...	Compound (Steam)	27,000,000	101	36	12	965	$4,176.00	$1,581.00	$179.00	$204.00	$10,694.00	$306.00	$17,140.00	$45,832.00	Paddles direct coupled

is punishing work. A breakdown has to be hastily patched, and proper repair left until the slack when the ice sets in once again.

Neither does work cease during the season with the big Diesel tankers on the Caspian Sea. The ships load well-off shore from oil pipe lines that run out from land to the deep water, and almost before the connections are broken, the Diesel engines are driving the vessels away to their destination where the oil is discharged in all haste, the ships turned again without delay or wait. How the motor machinery stands this severe strain can be seen by referring to the maintenance charges in the table that we publish in this issue.

True it is that one of the Nobel brothers runs a large Diesel engine works, but this had no influence on the shipowning company, and was proved by the fact that two-thirds of their orders for ships' Diesel motors were sent to the Kolomna works, while Ludwig (Louis) Nobel devoted most of his time and plant constructing Diesel engines for submarines, revenue-cruisers and gunboats for the Russian Admiralty.

Other Russian shipowning companies who own large fleets of Diesel-driven ships are the Caucasus & Mercury Steamship Co., and Merkulyeff Bros. The Caucasus & Mercury fleet was fully illustrated and described in Motorship for March, while the motor warships of the Russian Navy were illustrated in Motorship for November. Once again we repeat—Awake, America, Awake!

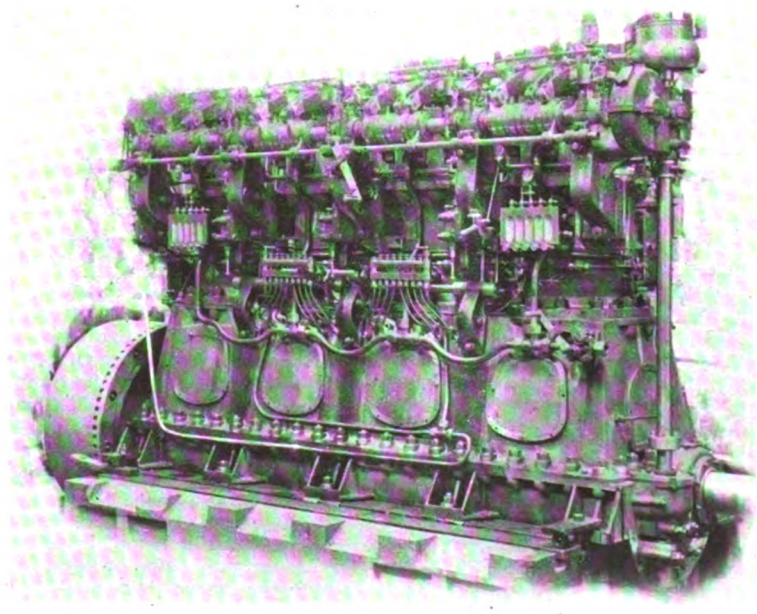
NEW GERMAN MOTORSHIP YARD.

The well-known A. E. G. company (Allgemeine Elekricitats Gesellschaft), of Berlin are to utilize some of the huge profits recently made by starting a large motorship building yard where big Diesel ships will be built for several shipowning companies in which they have acquired substantial interest. The Diesel engines to be adopted will be of the two-cycle type and of their own design. We should not be surprised to see the Junkers type, that is to say the opposing piston-type adopted, because one of the subsidiary companies of the A. E. G. were building such motors in small powers before the war.

WESTERN MEN TO AID SHIPPING BOARD.

Fifteen representative business men of the Pacific Coast have been nominated to act as advisory committee to the United States Shipping Board. This committee will meet in Seattle July 2 to effect its permanent organization.

The committee as appointed by President Frederick J. Foster of the Chamber of Commerce of San Francisco, is as follows: Capt. J. S. Gibson of the International Stevedoring Company, Seattle; J. E. Chilberg, Seattle Trust Company; William Pigott, Pacific Coast Steel Company; Chas. H. Hyde, Tacoma Savings Bank & Trust Company; J. J. Donovan, Bloedel-Donovan Lumber Mills, Bellingham, Wash.; H. L. Corbett, First National Bank, Portland; H. E. Pennell, St. Johns Lumber Company, Portland; B. F. Stone, Port Commissioner, Astoria; John McGregor, Union Iron Works, San Francisco; C. W. Cook, American-Hawaiian Steamship Company; J. C. Rohlfs, Standard Oil Company; J. H. King, Oakland Chamber of Commerce; J. S. Mitchell, Los Angeles; F. L. Baker, Baker Iron Works, Los Angeles; D. E. White, Spreckels Bros. Commercial Co., San Diego.



NOBEL DIESEL ENGINE AS INSTALLED IN NOBEL BROS.' FLEET

MARQUIS OF GRAHAM, G. C. V. O., A SCOTCH MOTORSHIP EXPONENT

A NOTABLE MARINE OIL-ENGINE ENTHUSIAST.

Brief Details of a Remarkable Career.

Few men have demonstrated a keener interest in marine oil engines than has the Marquis of Graham, G. C. V. O., who is one of the directors of Wm. Beardmore's, Ltd., the great Scottish naval engineering firm. Lord Graham is the eldest son of the Duke of Montrose, one of Scotland's largest real-estate owners, and in addition to being an engineer, holds a navigator's certificate, is vice-president of the Institute of Naval Architects, and is a past president of the Institution of Marine Engineers.

We often hear of the "idle" British aristocracy, but Lord Graham, who was born in 1878, served two years in the navy, passed to the mercantile marine, became Governor of Victoria, was navigating officer of the yacht "Sunbeam" when it crossed the Atlantic in 12 days under sail alone. He formed a member of Sir Norman Lockyer's expeditions to Vadsoe, Finland, in 1896 and 1898, taking moving pictures of a total eclipse of the sun, he himself inventing a special device for connecting the camera to a sidereal clock. He also served in the Naval Brigade during the South African war, and afterwards undertook many important diplomatic positions, with the government. Also he went to South Africa on a special mission for Lloyd's Register Corporation.

In 1906 he personally made experiments with a 500 b. h. p. slow-speed marine gas engine in the old H. M. S. "Rattler," and in 1911 built the crude-oil-engined (hot-bulb) yacht "Mairi," and gave demonstrations around the coasts of the British Isles. He now is engaged on special naval service in Scotland. We have been obliged to omit many of the remarkable things done by Lord Graham, but he is a man exceptionally progressive, alert in practical mechanical knowledge, a constructive man of business, and capable of planning and carrying out vast schemes of commercial enterprises. As an engineering-director his services have been of tremendous value to Beardmore Bros. He has just accepted the presidency of the British Empire Producers Organization, which doubtless will add to his remarkable career.

PISTON RING LOGIC.

By E. G. Norris.

An interesting story surrounds the development of the piston ring from the obscurity to its present recognized importance in the operation of a motor. Six years ago not even a gasoline engine maker himself knew the importance of the piston ring. It was simply realized that piston rings were necessary and they were bought in the cheapest possible way and put on pistons which then went out into service. As compression failed carbon developed and the quantity of oil and gasoline increased so there was nothing for the poor owner to do except reequip his motor with more of the old style, one piece, inefficient rings.

Then came a pioneer with an idea—with a realization that the piston ring was really the key to the motor's performance and power. This idea was a better piston ring than the one piece ring which was in general use. It was the present widely known "Leak Proof" piston ring consisting of two sections or halves made in angle iron or "L" shaped form, which construction produces the greatest piston ring strength and efficiency. Each section permanently seals the opening in its opposing member so that compression leakage is impossible. The two sections being of the same weight, the tension of the ring is absolutely uniform throughout the entire bearing on the cylinder wall.

Uniform tension and bearing on the cylinder wall with no unguarded opening through which the compression can escape are accomplished with this construction as they can be in no other way. The oldest piston ring construction in the world is the concentric type, which means a ring of the same thickness all around. Its great defect which served to disqualify this type of ring and make it almost obsolete is that throughout its circumference it cannot exert the same pressure against the cylinder wall. As a result of which there is a power waste, unequal wear and friction loss. Several of the patented rings which have followed the pioneer into the market are merely old style, one piece concentric rings with their opening closed by a joint of some sort. This in no way improves the unequal bearing, the greatest fault of the ring, so that it still leaves the patented article woefully inefficient.

Manufacturers still buy piston rings only on a price basis. That is why motors still come to the owners equipped only with the old style, one piece rings, or one of those rings with closed slot. They can be purchased so cheaply and made to perform with moderate satisfaction during the early life of the motor, while the cylinders are perfectly round and the pistons are still a tight fit. But with wear, and after a few hundred miles of driving as the motor limbers up, these inefficient piston rings begin to fail and there are power losses, fuel waste and carbon deposits. Then comes the need for the highest type of piston ring to correct this trouble. The finest possible grade of gray iron is the necessary foundation. The pioneer, the "Leak Proof," found it necessary to develop a special processed iron which is poured under their own supervision before it was possible to produce the desired results. Then comes the second step—the machining process. As against the three operations required to produce the average one-piece ring, seventeen different operations, each carefully inspected by micrometer measurements, are necessary before the two piece, rectangular "Leak Proof" ring is a completed article. Actual tests by soleroscope prove that these rings are of softer iron, due to their special process, than any single piece ring made. Mileage and time tests in actual service prove the toughness and wear resisting qualities of this iron.

DIESEL TRAINING SHIP FOR DANISH ENGINEERS NEARS COMPLETION.

Several years ago the East Asiatic Co. ordered a large auxiliary vessel from Messrs. Ramage & Ferguson, of Leith, Scotland, in which was to be installed two 6-cylinder Diesel engines of 600 b. h. p. each, which were to be built by the Burmeister & Wain Oil Engine Co., of Glasgow, Scotland. The war held up the construction but this ship is now nearing completion, and will shortly be launched. She will be used as a training vessel for motorship engineers, thus following the example set by German ship owners; an example which, as we pointed out in a recent issue, could well be copied by American ship owners. The "Kobenhavn," which this vessel is named, is of 3,490 gross tons, and is 354 feet long by 49 feet beam and 25 feet 6 inches moulded depth. She will, of course, carry a considerable amount of cargo, so will pay for herself in operation. She is larger than the German training ship, which is under 2,000 tons gross.

DIESEL ENGINE COMPANY HAS FIVE AND ONE-HALF MILLION CAPITAL.

The new Atlas Diesel Engine Works of Stockholm has a capital of $5,600,000, and in the combine are the A. B. Diesels Motorer and the old Atlas Engine Works. We also understand that the McIntosh & Seymour Co., of Auburn, N. Y., will be associated with the new concern. Not indirectly connected with the venture are said to be the Nobel oil interests and one of the largest of the Swedish Banks; while the National City Bank of New York has some connection with the American company.

"SANTINO" REACHES BALBOA.

The auxiliary-powered schooner "Santino" has just completed the second lap of her voyage to Boston, Mass., from Seattle, with a cargo of 2,250,000 feet of lumber. Information to the effect that she had reached Balboa in the Canal Zone has been received. She made the voyage from San Francisco to Balboa in twenty-eight days, a distance of more than 3,500 miles.

A complete description of the engines of the "Santino" and photographs were printed in the April issue of Motorship.

COST OF LUMBER AND STEEL TO BE PROBED.

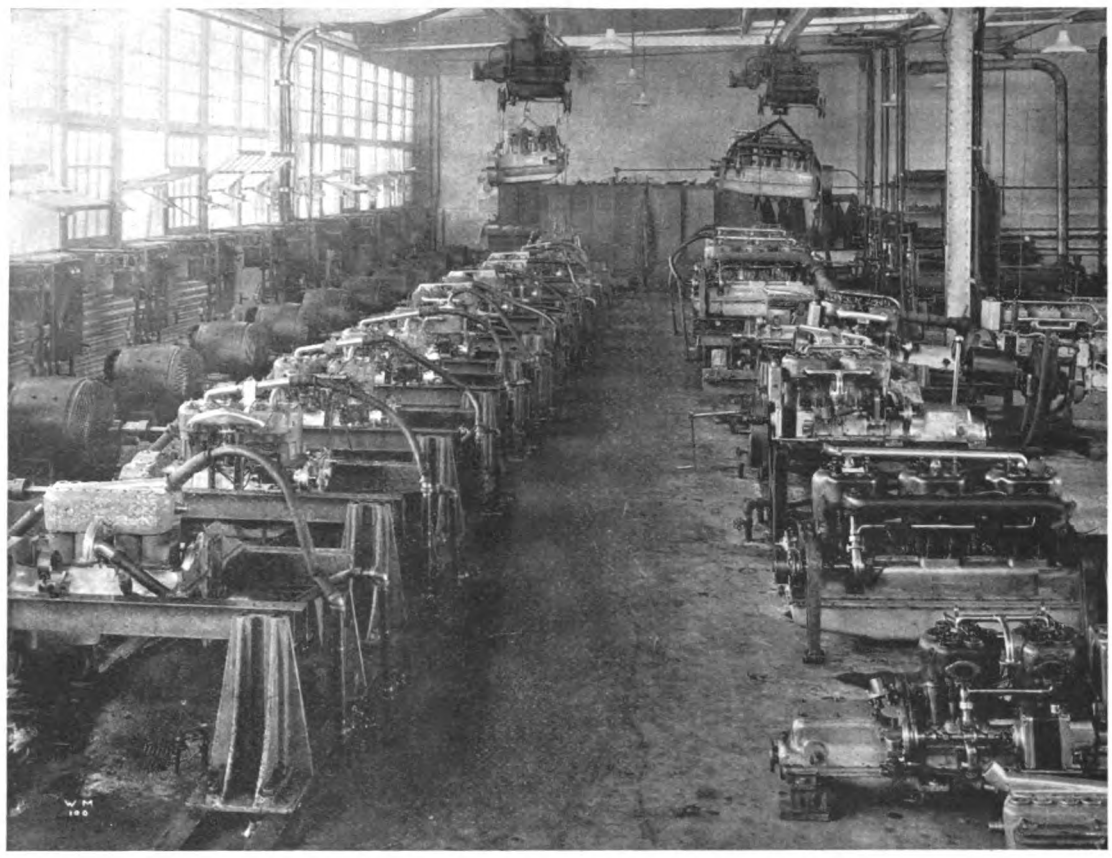
The federal trade commission has been directed by President Wilson to make an investigation into the costs of production of steel and lumber, the principal materials that will be required for the great merchant marine to be built for the government. The prices fixed by the commission will govern in other government work, as well as ships, in which these materials will be used.

A NEW CATALOGUE.

The Knox Motors Company of Springfield, Mass., has issued a very attractive catalogue descriptive of their 300 h. p. aircraft motors.

AUSTRALIAN SHIPBUILDING.

The Australian Commonwealth is devoting close attention to the question of shipbuilding in Australia, and early action is expected.



NEW TEST ROOM, WISCONSIN MOTOR MANUFACTURING COMPANY

NEW TEST ROOM.

The Wisconsin Motor Mfg. Company, Milwaukee, Wis., has recently added a new test room which is entirely electrically equipped.

Each test stand has an individual electric motor generator unit. When an engine is completed in the assembly department, it is sent to the test room and connected up with the motor generator which acts as a motor and drives the engine until it is sufficiently free to allow it to be run under its own power. A uniform product is assured as each instrument board is equipped with meters which give the actual power required to drive the engine.

When the engines are sufficiently free, they are started and run under their own power, driving the motor generator as a generator. The load is then gradually increased until motor develops the required power and then it is run under full load for several hours.

The engine is then picked up with an electric crane, of the monorail type, and taken to the final inspecting department, where the motor is completely dis-assembled and all moving parts are given a thorough inspection and adjustment, after which motor is again placed on the test stand and run again for several hours. It is then ready to be shipped.

The large number of special motors built, made it necessary to have a test stand which can easily be adjusted to any width of supporting arms and to any drop or rise. The motors are connected to the generator with an ingeniously designed coupling which is readily assembled in a few minutes.

All the current that is generated by the generators during tests is reverted into the factory line and used to drive the machinery, giving the benefit of power which otherwise would have been wasted.

Each motor has an individual exhaust pipe leading to the outside of the building. These pipes are underground. A connection is arranged at each test stand for water, gas and gasoline. The motors are run on illuminating gas unless a fuel economy or carburetor test is desired.

A new experimental laboratory has just been completed. This is equipped with a three hundred horse power Sprague dynamometer so arranged that a motor can be mounted on either end and driven in either direction. Complete equipment has been added for making horse power and torque curves, fuel economy curves, oil consumption curves, friction horse power curves, etc.

This laboratory will be used for experimental work in connection with the improvement of the product.

ENORMOUS DIESEL MOTORSHIP PROFITS.

The United Steamship Co., of Copenhagen, Denmark, owners of a fleet of large Diesel-driven motorships, including the M. S. "California," a vessel of 8,300 tons d. w. c., and 2,600 i. h. p. has just paid a dividend of 35 per cent for 1916. This after setting aside 11,800,000 Kroners ($3,540,000) as a special reserve; 10,500,000 Kroners ($3,150,000) to the statutory reserve, writing off 5,047,877 Kroners ($1,922,497.80) in taxes for 1916. Still the steamship owners of the United States apparently sleep in peaceful oblivion of these significant signs of the times.

CRAMP COMPANY TO INSTALL BURMEISTER AND WAIN ENGINE OF THEIR OWN MAKE.

The William Cramp and Sons Ship and Engine Company, of Philadelphia, which has taken a license to build Burmeister and Wain Diesels, intends to install engines of this type in a vessel of 12,000 tons displacement, which it has just laid down. The ship is to be practically a duplication of the 420-foot Copenhagen type, and her propelling machinery will consist of two six-cylinder engines, each developing 1550 h. p. at 125 revs. As there is nothing experimental in Burmeister and Wain engines of the size indicated, it may be assumed with reasonable safety that the Cramp Company's first Diesel ship will be a success. If she is, the result will be far-reaching, as, for reasons which are not obscure, there is bound to be heavy ordering of coastal vessels when the war comes to an end. Moreover, if American shipping enterprise goes further than protected coastal trade the Burmeister and Wain engine is bound to find great favor, for it is not only a good motor but has proved itself to be one in the rough and tumble of sea work.

SUBMARINES AND MOTORSHIPS.

Since the war started no fewer than three Werkspoor Diesel-driven motorships have been attacked by submarines, and in each case the boats have got away successfully. The first attack was the torpedoing of the M. S. "Artemis," which safely reached a Dutch port; but in a sinking condition and was repaired. The second was the holding up of the M. S. "Vulcanus" in the English Channel, while the latest instance was the shelling of the M. S. "Selene." In the latter case eight men were killed as they were being lowered in a boat, whereupon the captain made full speed ahead and successfully got away.

It is not generally known among shipowners that Diesel engines have a power output of about 40 per cent over that of normal operation, and it is possible for such excessive power to be maintained for a couple of hours, though, of course, cylinders and pistons are liable to crack under such abnormal stresses; but a few cracked cylinders is a very small matter if the ship is saved. All the three ships mentioned above are owned by the Dutch shell interests.

A NEW WAR MEASURE.

A war measure intended to insure governmental control of sea craft and to prevent acts of hostility to the United States has been drawn up and is to be enforced.

This regulation requires vessels of all sizes, including yachts, motor-boats, motor ships, cargo carriers and passenger boats, with headquarters in the United States ports, and their tributaries, to register and take out licenses. With all vessels thus under the official eye it will be almost impossible for any act of treason to be consummated.

NEW LIBBY SHIP TO HAVE FIRST DOW DIESEL INSTALLATION.

A large wooden ship building at the Standifer-Clarkson Shipyards, North Portland, for Libby, McNeill & Libby, is to have installed in her the first set of Dow-Willans heavy-duty, direct-reversible, marine Diesel oil engines. These engines are manufactured at the plant of the Dow Pump & Diesel Engine Company of Alameda, Cal., who have for some years been building a very successful stationary Diesel type engine, being the sole U. S. A. licensees of Willans & Robinson, of Rugby, England, whose motors are operating central stations, pumping plants, etc., all over the world. In making their marine set the Dow Company have maintained the principal features of the Dow-Willans motor, and have added the direct reversing feature necessary to make it adaptable for marine practice. They are building sizes from 160 b. h. p. to 1,000 b. h. p. In the February number of Motorship a complete description of this type of engine is given.

The Dow Company is especially adapted to manufacture these engines as it has its own foundry where it can make its own castings. It has also a large pattern shop, besides two Schwartz furnaces for brass and aluminum castings. High-power marine engines of other makes have been made previously at this plant, requiring a complete set of tools.

The success of this new vessel equipped with the first set of Dow-Willans engines will be eagerly watched by all those interested in Diesel engines and their manufacture.

ANNOUNCEMENT.

Frank Walker, marine surveyor, consulting engineer, naval architect and surveyor to Bureau Veritas, with offices at 211-213 Grand Trunk Pacific Dock, Seattle, Washington, announces the association with him of his son, Kenneth M. Walker, until recently with the Union Iron Works, San Francisco. The business will be conducted, as formerly, under the name of Frank Walker.

"IDA ETTA" TO HAVE AUXILIARIES.

The former sealing schooner "Ida Etta," purchased by Atkins Kroll & Co., of San Francisco, is outfitting for her voyage to San Francisco at Victoria, B. C. She will be equipped there with auxiliary power and sent across the Pacific to go into the Philippine coasting trade.

FRENCH GOVERNMENT INSPECTS COLUMBIA RIVER POSSIBILITIES.

A naval architect from Paris and a representative of the French Government, Roland Nepveu, have recently arrived at Portland, Oregon, to examine Columbia river shipbuilding facilities.

BIG DIESEL MOTORSHIP LOAN.

The Swedish Government has granted a loan of 750,000 Kroners ($225,000) to the North Star Steamship Co. (Nordstjernan A. B.) as part payment for one of the two large Diesel-driven motorships now under construction at the Burmeister & Wain shipyards in Copenhagen, Denmark. This gives an excellent idea of the European attitude towards big motorships.

The Atlantic Fruit company, of New York, have owned for one year a Diesel-driven tug of 70 h. p., during which time the total repair bills, in addition to the spare parts supplied with the engine, amount to $7.67.

ITALIANS TAKE MOTORSHIP "KRISTIAN X."

The motorship "Kristian X," which the Hamburg American line bought of the East Asiatic Co. three years ago, has been taken over by the Italian government. The Italian government paid the Danish chief engineer 10,000 francs to take the ship from Genoa to Port Said in order to break in another chief.

A HINT TO THE A. S. M. E. N. A.

We offer as a suggestion to the American Society of Marine Engineers and Naval Architects that they offer a Gold Medal and Certificate for the best annual assay, paper, or article, "on "Marine Oil Engines and their Application to the Propulsion of Mercantile and Naval Ships" received from engineers, whether, or not, members of the Society. The good results of such an encouragement are too obvious to need portraying here.

STEAMSHIP RELIABILITY.

A new American-built steamship was recently sunk in mid-Pacific while on her maiden voyage, and her sister steamship was recently disabled at sea, also when on her maiden voyage. Better build Diesel motorships—they are reliable.

DANISH AUXILIARY SCHOONER.

Among auxiliary schooners recently placed in service in Europe may be mentioned "Alfa," a owned by H. Christensen of Marstal, Denmark, and is equipped with a 2-cylinder Bolinder surface-ignition oil engine of 160 b. h. p.

GUNS OF THE "QUEEN ELIZABETH."

The 15-in. guns of the "Queen Elizabeth" are 65 ft. in length, and weigh 100 tons, and were built by Beardmore & Co. at their Parkhead works. The first was completed in December, 1913. It is said that they since have been replaced with 16-in. guns, the change having taken place after the Dardanelles campaign.

ENLARGEMENT OF THE SKINNER & EDDY PLANT.

Following negotiations that have extended over a year, the Skinner & Eddy Shipbuilding Corporation of Seattle have recently completed the purchase of five and a fraction acres adjoining their plant and will immediately commence the construction of two new ship ways.

"CITY OF PENSACOLA" LAUNCHED.

The five-masted auxiliary schooner "City of Pensacola" was launched at the Piaggio shipyard, Orange, Tex., recently, being the third vessel of that type to leave the ways there since last November, with nine more building.

BRITISH COMPANIES POOL DISTRIBUTING FACILITIES.

Late reports from the United States Consul General's office in London are to the effect the British government has organized a pool board to handle all petroleum supplies, with an office at the Ministry of Munitions. The object of the board will be to pool distributing facilities of all petroleum companies employed in bringing supplies into the United Kingdom.

The board consists of representatives of the following companies: The Anglo-American Oil Company, Ltd., Anglo-Mexican Petroleum Products Company, Ltd., Bowring Petroleum Company, Ltd., Oil Marketing Company, Ltd., British Petroleum Company, Ltd., Home Oil Company, Ltd., Union Petroleum Products Company, Ltd., H. B. Wheatley & Company, Ltd.

All products except lubricating oil hitherto delivered under proprietary brands will in the future be delivered under war brands, and distributed on the authority of the pool board, it is stated.—From National Petroleum News.

BRITISH FIRM ORDERS THREE MOTORSHIPS.

Three large Diesel-driven motorships are in course of construction in the United Kingdom to the order of Elder Dempster & Co., Ltd. These vessels will be of 10,000 tons d. w. c., and will be driven by two British-built Burmeister & Wain reversible marine oil engines of 1,500 i. h. p. each. Incidentally it may be mentioned that according to Shipping Illustrated, a Burmeister & Wain motorship recently completed a six months' voyage without a single involuntary stop.

THE DAILY MARINE RECORD

America now has her own daily shipping paper, published under the above title, at 20 Vesey Street, New York. Subscription $5 per year; Canada and foreign $5.50 and $6 respectively. The following gentlemen holding office: Henry D. Cooper, president; John R. Rowland, vice-president; E. F. Sterger, secretary; J. C. Gregory, treasurer.

Motorship congratulates President Rowland and staff upon the excellence of the publication and extends best wishes for success in the field which the Daily Marine Journal is pioneering.

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